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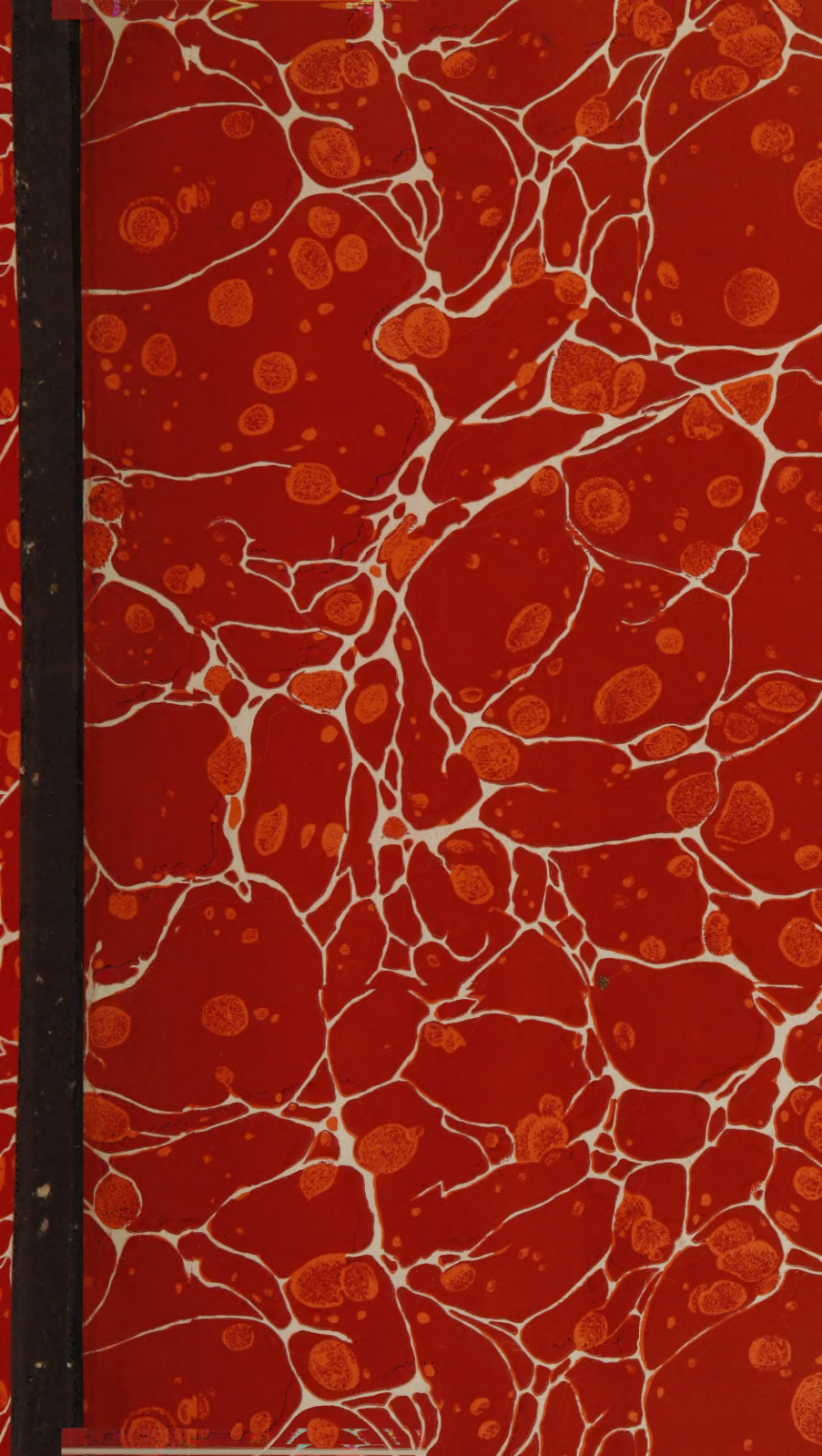
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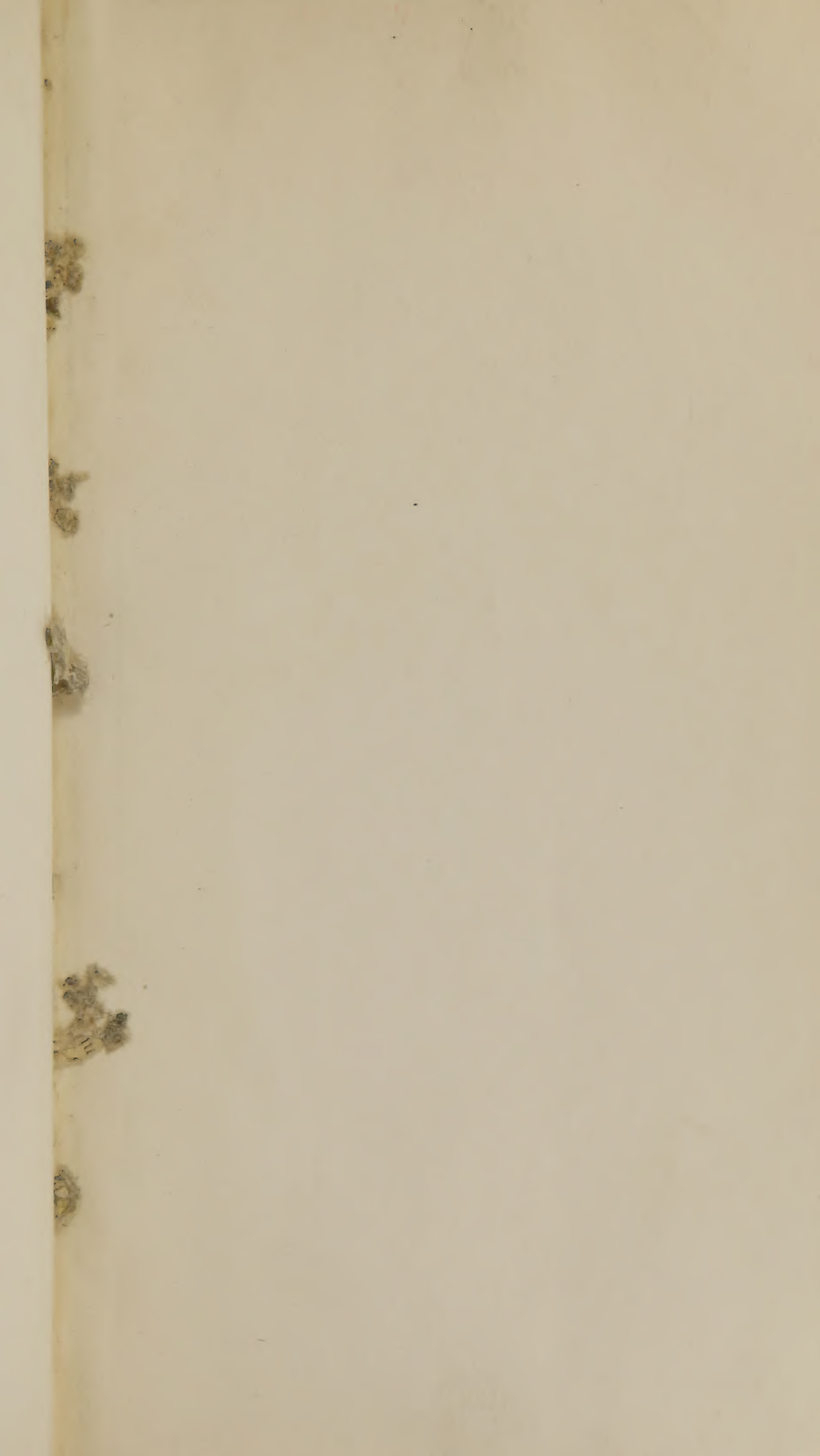
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SIR ASTLEY COOPER'S

LECTURES ON SURGERY.

SIR ASTLEY COOPER'S

LECTURES ON SURGERY

THE
LECTURES

OF

SIR ASTLEY COOPER, BART., F.R.S.,

SURGEON TO THE KING, ETC.,

MASS. MEDICAL COLLEGE
ON THE

PRINCIPLES AND PRACTICE OF SURGERY,

WITH

ADDITIONAL NOTES AND CASES.

BY FREDERICK TYRRELL, Esq.

SURGEON TO ST. THOMAS'S HOSPITAL, AND TO THE LONDON OPHTHALMIC INFIRMARY.

FIFTH AMERICAN, FROM THE LAST LONDON EDITION.

COMPLETE IN ONE VOLUME.

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P R E F A C E.

THE principles contained in the following Lectures, have almost entirely originated from Sir Astley Cooper, and have been taught by him for more than thirty years.

Their excellence and accuracy have been proved, not only by the extensive and successful practice of Sir Astley himself, but by the experience of several thousands of medical men who have received them from him, and by whom they have been propagated through all parts of the world in which surgery is practised as a science.

Having, by the greatest industry and perseverance, gained a character and celebrity, which few in any profession have acquired, and none more deservedly obtained, Sir Astley is now about to resign his situation as Surgical Lecturer, which he has held with so much honour to himself, and advantage to those who have received instruction from him.

Confident, therefore, that a correct and authentic copy of his Lectures will be acceptable to the profession, and having, as his apprentice, and, subsequently, had the best opportunities of becoming acquainted with his professional opinions, I have undertaken the publication of them.

Before sending the work to press, I took the liberty of requesting Sir Astley to peruse it, which he has had the kindness to do, and returned it with the following note :

“DEAR SIR,

“I have looked over the manuscript of my Lectures on Surgery.

“It contains a faithful account of the principles of Surgery, which, for forty years, I have been endeavouring to learn, and of the practice which, for thirty-two years, I have been in the habit of teaching, in that school which is proud to rank amongst its Lecturers in Surgery the names of Cheselden, Sharp, Warner, and last, although not least, of my most able and judicious preceptor and predecessor, Mr. Cline.

“I have sent you a few observations on the swellings which form in the Nipple, and upon the structure in which they are founded; this may form an Appendix to the diseases of the breast which are described in the work.

“I am,

“Yours, very truly,

“ASTLEY COOPER.”

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LECTURES, ETC.

LECTURE I.

GENTLEMEN,

THE subject of this evening's lecture is, Irritation ; which, being the foundation of surgical science, you must carefully study and clearly understand, before you can expect to know the principles of your profession, or be qualified to practise it creditably to yourselves, or with advantage to those who may place themselves under your care.

The doctrine of irritation teaches the immediate and remote effects of injuries ; in what manner nature restores them on the one hand ; and, on the other, the mode in which apparently trifling accidents prove ultimately destructive.

It is easy to conceive how the division of a large artery occasions death by hæmorrhage ; but to explain the means by which an apparently slight injury, as a scald or a burn, produces the same destructive effect, requires an intimate acquaintance with the subject of irritation.

The Actions of the Body supported by Natural Stimuli, directly, remotely, or by sympathy.—All the actions of the body are excited and sustained by internal and external impressions, which are called stimulants ; as the blood is the stimulus to the blood-vessels, the bile to the intestines, and heat, in a certain degree, to the whole system ; and there exist between all parts intimate relations, corresponding with each other and carrying on a reciprocal intercourse of action. The beautiful harmony produced by a perfect concurrence of all the actions, is called health. Thus, impressions not only produce effects on the part to which they are directly applied ; but, in consequence of the freedom of nervous communication, remote parts of the body are becoming affected by them, and many of its natural functions are supported by sympathetic communication. The real nature of sympathy is yet unknown, but we are acquainted with many of its effects ; and, as an example, we may give the communication which exists between the uterus and breasts ; as the former is impregnated, and the various changes proceed in it during the period of gestation ; so corresponding alterations are proceeding in the breasts, the glands enlarge gradually,

the nipple becomes elongated, and the secretion of milk commences ; thus, before the child is born, nature has carefully provided for its future support. Many other of the natural functions of the body are supported upon the same principle ; as sneezing, which is a sympathetic action between the nose, velum palati, and the abdominal muscles, instituted to remove causes of irritation from the nose: coughing, which is a sympathy between the larynx and abdominal muscles: breathing and the expulsion of the fæces are also sympathetic functions, and with these a multitude of other examples might be given.

Diseased Sympathy.—But sympathetic effects also follow injuries and diseases, and become the causes of restoration on the one hand, or of destruction on the other ; and this state of the body is called irritation.

Definition of Irritation.—Irritation may be defined to be, an altered action excited in the body by an unnatural impression.

Irritation of Sensation.—Irritation sometimes produces only diseased sensation ; thus a sympathetic pain is experienced in the knee and foot from diseased hip ; when a person has a stone in his urinary bladder, acute pain is felt at the extremity of the penis ; the passage of an urinary calculus through the ureter occasions retraction of the testicles and pain in the thigh ; a diseased prostate gland produces pain in the inner part of the thighs ; disease of the uterus occasions pain in the loins, and around the hips, and sometimes weakness of the inferior extremities, amounting nearly to a state of paralysis ; pain and heat in the throat arise from a morbid state of the pylorus ; itching in the nose from worms in the intestinal canal ; pain between the shoulders from affection of the liver ; and pain in the loins from inflammation of the testicles.

Diseased Action produced by Irritation.—But by irritation, not only diseased sensations but morbid actions are excited in other parts, which are near and intimately connected, or in distant parts ; thus inflammation is produced in the testicle from irritation in the urethra. Swellings in the breast are frequent consequences of morbid change of the functions of the uterus ; the diaphragm is frequently thrown into convulsive action, from gangrene of the most remote parts ; producing hiccough : retention of urine I have known more than once occur after the operation for popliteal aneurism. But there is no organ more frequently affected by irritation than the stomach. For instance, a blow is received on the head, occasioning injury to the brain ; vomiting is one of the first and most constant symptoms, and by this we are led to detect such injuries. Vomiting is produced when the testicles are injured ; when the intestines are burst, wounded, or strangulated, and from a gall-stone passing the biliary duct : injury to the iris frequently occasions vomiting ; and an obtuse pain in almost any part of the body will occasion sickness.

Course of Irritation.—Irritation is generally communicated through the medium of the nerves, of which there are two systems in the body ; the first, composed of the brain, spinal marrow, and their

nerves, which naturally convey sensation and volition ; the second, consisting of the grand sympathetic nerve, the centre of which is behind the stomach, in the semilunar ganglion and solar plexus. The modes of sympathetic communication are various. In some instances, the course of irritation is from the irritated part to the sentient extremity of the nerve, as the pain experienced in the knee and foot from a disease of the hip ; or the pain in the little finger and half of the ring finger, when the ulnar nerve is struck at the elbow ; injuries of the brain produce vomiting, their influence being imparted to the stomach through the medium of the eighth pair of nerves. In other cases, the course of sympathy is from the affected part to the origin of the nerve ; thus pain in the loins is consequent on diseased testicle ; or pain between the shoulders from affection of the liver. Occasionally the sympathetic communication is through the brain, as the following case will prove. Mr. Toulmin, of Hackney, attended a lady on account of her suffering severely from a diseased tooth, and she appeared also to be afflicted with hemiplegia. Mr. Toulmin extracted the tooth by the lady's desire, and in a short time the paralytic affection entirely subsided.

Irritation on the nerves of the grand sympathetic is communicated to the stomach probably through the medium of the semilunar ganglion, and vomiting is directly produced, also in strangulated hernia, or when biliary or urinary calculi are passing the respective ducts, or when a severe blow is received upon the testicle. The other system of nerves, viz., of the brain, spinal marrow, &c., are less affected in these cases ; and, even when injuries prove fatal, the absence of cerebral sympathy is remarkable, as the patients are generally quite collected, until nearly the last moment of their existence.

Irritation is local or general.

Local.—Sometimes it is local only ; thus, a decayed tooth will produce an abscess, and the matter escape by forming an opening through the cheek : this ulcer will be very difficult to heal, if the tooth remain ; but extract it and the disease will quickly disappear, the cause of irritation being removed.

Many cases of this kind have fallen under my observation, and I will relate a few of them by way of illustration.

Case.—Some years since, two persons came to consult me from the same town (not knowing each other's situation or intention) ; each of them had an abscess near alveolar processes ; which, on examination, I found extensive, and it had produced an opening through the cheek. The disease had been of long standing in both cases, and occasional pain was experienced in the surrounding parts of the jaw ; I directed a diseased tooth, near the ulcer, to be drawn ; which being done, the patients quickly recovered.

Case.—A lady was for a long period afflicted with a fungoid granulation, which protruded through an ulcerated opening in the cheek : she tried for several months every remedy that was recommended to destroy the fungus, but without producing the desired effect ; a tooth, nearly opposite the opening, being occasionally painful, she was advised

to have it extracted ; this was done, and there was no longer a difficulty in curing the fungoid growth ; for it was absorbed rapidly, the most simple applications only being used.

Case.—A gentleman, of my acquaintance, was much annoyed by an ulcer on his chin, every attempt to heal which had proved abortive ; at length one of the neighbouring teeth became painful, and was in consequence extracted ; when, to the great delight and astonishment of the gentleman, the ulcer on his cheek healed rapidly. These cases are mentioned to show the necessity of seeking, with all possible care and attention, for the causes of irritation ; as the removal of them is often alone sufficient to effect a cure, and always to afford relief, which would not otherwise arise. Most of you have probably experienced suffering produced by the irritation of an extraneous body lodging under the eyelid, and the instantaneous relief afforded by its removal.*

General.—Of the *general effects* which are produced by irritation, we may mention the following : a person has a bougie passed into his urethra for the first time, the urethra is irritated by it ; he says, I feel faint : becomes sick, looks pale, and, without care, he drops at your feet ; his pulse has nearly ceased, and his body is covered with a cold perspiration ; you place him on a sofa, with his head a little lower than his body, and, as soon as the blood freely enters the brain, all his functions are restored : thus by irritating the urethra the stomach is influenced, the actions of the heart are suspended, and the powers of the mind vanish. In irritation of the urethra, on the evening of the same day to the introduction of the bougie, rigors, succeeded by heat, and profuse perspiration, are common consequences. Fever is excited in dentition, and a paralytic state of some part of the body is not an unusual consequence : a child frequently loses the use of one arm, or one leg, or sometimes of both legs, from the determination of blood to the head in this fever.

Slight injury to the stomach, although it does not occasion any sensible organic change, will sometimes destroy life. A man, recovering from fever and walking in Fleet Street, quarrelled with a woman ; another female came up, and gave him a blow in the region of the stomach, which caused almost instantaneous death. Upon dissection, to discover the cause of his expiring so suddenly, no morbid change was perceptible.

Case.—A healthy labourer, belonging to the India House, was attempting to lift a heavy weight, when another labourer came up, and

* A man, who was employed at a manufactory for fire-arms in the country, was struck by a small scale of metal in the eye : it penetrated the anterior part of the cornea, and became fixed between its laminæ ; it produced considerable irritation and inflammation : numerous attempts were made to extract it, but without success, and the irritation and inflammation increased in spite of the very active means used to subdue them. After a few days he was sent to town, with a note requesting I would give him my assistance ; with some little difficulty I succeeded in removing the foreign body from the cornea, when the irritation and inflammation quickly subsided, and in a few days he again returned to the country with only a small speck on the cornea, in the situation of the wound.—T.

said, 'Stand on one side, let an abler man try;' at the same time he gave the former a slight blow on the region of the stomach, when the poor fellow immediately dropped down and expired. On examination of his body there was not any mark of violence discovered.*

Usual Symptoms of General Irritation.—The symptoms of constitutional irritation which follow accidents will be best exemplified in compound fracture. A person receives an injury to one of his legs, occasioning a compound fracture of one or both bones: constitutional irritation soon commences; he first complains of pain in his loins, as if from an uneasy position; this extends to the back, in the course of the spinal marrow to the brain, occasioning pain in the head; he then becomes restless, and his countenance expresses anxiety; the tongue, at first, is covered with a whitish fur; but as the irritation increases it becomes yellow, and subsequently, in the aggravated stage, it has a dark brown coating; loss of appetite, nausea, and vomiting, evince derangement of the stomach; the secretion of the liver is so far diminished, that bile is produced in very small quantity, so that the motions are white, and sometimes a fluid is produced, which differs much from bile in its appearance.† The secretion of the intestines is diminished and unhealthy; the bowels are constipated, the kidneys secrete but little urine, and it is of a deep colour; the skin has its secretion stopped, and it is hot and dry. As these symptoms arise, the pulse quickens, becomes hard, irregular, and ultimately intermittent: corresponding alternations take place in the respiration; it being, at first, somewhat quicker, and finally much hurried and laborious. The functions of the brain, spinal marrow, and nerves become further changed; subsultus tendinum is produced; slight impressions on the senses become almost intolerable; the mind is at first hurried, and then the patient sinks into a low, muttering delirium. The grand sympathetic nerve becomes further affected; the abdomen swells from accumulated flatus in the intestines; vomiting and purging often both occur; hiccough is produced, and the patient, absolutely worn out by irritation, expires. Thus in constitutional irritation, whether from injury, or from external or internal disease, every part of the system may be affected, and it appears to take place in the following way. When a part of the body receives an injury, the nerves convey a knowledge of it to the important organs, as the spinal marrow, brain, heart, stomach, &c.: nature immediately commences the restorative process, by stopping all the customary secretions; the various outlets being thus closed, the blood collects in quantities in the heart and large blood vessels, which propel

* Query—Does the blow affect the semilunar ganglion?

† A child received a blow on the head, which occasioned inflammation of the pia mater, of which it died. On examination after death a colourless fluid was found in the gall-bladder, some of which is preserved in a glass tube, in the museum at Guy's Hospital.

When great constitutional irritation exists in children, their motions, when exposed to the air, become green, and this is more particularly the case when the brain is chiefly affected.

it with unusual force to the injured part ; giving rise to inflammation in whatever form can best accomplish the desired effect. This is an illustration of the manner in which nature contends for a cure ; she occasionally requires to have her ardour checked, or aided, in proportion to her powers : we must watch with “eagle’s eyes” her proceedings, and be exceedingly cautious in our interference ; for by restoring the natural secretions too soon, we may, by thus abstracting blood from the injured part, prevent the restorative process ; or, by adding to excitement, we may prevent the beautiful and judicious operations of nature, by producing too much action.

The degree of constitutional irritation resulting from injury depends on several causes.

The Importance of the Part injured.—1st. On the importance of the part injured. A blow on the abdomen from the kick of a horse, by which one of the intestines becomes burst, renders the pulse scarcely perceptible at the wrist, covers the body with a cold perspiration, and destroys life in from twelve to eighteen hours.

The Extent of Injury.—2dly. In parts less important, on the extent of injury, as compound, when compared with simple fractures.

The Nature of the Injury.—3dly. On the nature of injury, as in wounds : if a wound be a simple incision, it easily heals ; but when contused, the parts must slough, before the injury can be cured ; punctured wounds also, by the influence on the nervous system, frequently occasion tetanus.

The Difficulty of Restoration.—4thly. On the difficulty of restoring the injured part, as wounds of ligament, tendon, fasciæ, or cartilage ; and parts possessing but little vital powers, as in wounds and diseases of joints.

State of the Constitution.—5thly. On the state of constitution at the time the injury is received ; this varies at the different periods of life, and is modified by the patient’s habits, his mode of living, and the climate in which he resides. Excessive irritation frequently follows operations on very young subjects, but rarely those performed on very old persons. I have known children, after having undergone the operation of lithotomy at a very early period, die of convulsions. I should not, therefore, recommend the operation to be performed on a child under the age of two years. I have, however, operated successfully for lithotomy, at the age of one year and nine months, but am disposed to recommend its postponement when possible. In infancy the irritability is excessive, and the system is easily excited to destruction : after the period of two years, the irritability is considerable, but the powers of restoration are great. In middle age, the irritability is less, and the restorative power still considerable : in age the irritability is much diminished, but the powers of restoration are less also. Persons who are deprived of their natural rest, and take little food, suffer more from injuries than those who sleep their due proportion ; and the temperate man often suffers but little from an injury, which will produce most distressing constitutional symptoms

in an intemperate person.* The following cases are impressive, showing the dreadful constitutional sufferings which occasionally result from slight local injury. Dr. Ludlow, of Calne, pricked his hand with a thorn in shooting, and died of tetanus in a few days. I was called to see a young gentleman who had been thrown into a hedge, by which his hand was lacerated; in seven days he had symptoms of tetanus, and on the ninth day he died.

Case.—A man, who lived intemperately, was bled on Tuesday, by the late Mr. Saunders; on the Wednesday he invited some friends to partake of a haunch of venison, of which he ate largely, and on the same evening drank a considerable quantity of wine; on the Thursday the party met again to finish the haunch; the patient indulged as freely on this day as on the former; this excess produced inflammation of the wound in the arm, which extended rapidly, and on the Saturday

* In persons addicted to the constant use of stimuli in large quantities, the natural powers of the constitution are so weakened, that they are not sufficient for the restoration of a severe injury, when the patient is altogether deprived of the stimuli; it is therefore, necessary, in many of these cases, to allow them to be taken in moderation, to produce the proper action for repairing the injured part. This is well illustrated by the following cases, which also show the necessity and importance of a minute inquiry into the history of patients, previous to their coming under your care.

John Westrip, æt. 30, was admitted into St. Thomas's Hospital on account of a severe injury to the elbow joint, caused by the wheels of a loaded coal wagon passing over the part. The nature and extent of injury were such, that I thought it advisable to amputate the limb. This was done about twenty hours after his admission into the hospital, as he would not submit to have it performed sooner. He was much intoxicated when the accident happened, but I could not get any information as to his previous history from the persons who came with him, for they had not been before acquainted with him. On the second day after the operation he had severe constitutional suffering; his pulse was very quick, his skin hot, his countenance anxious; the stump was much inflamed, and very painful: these symptoms rapidly increased, he became delirious, and the edges of the wound began to slough; the usual remedies were given to subdue the irritation, but without producing relief. On the evening of the day after he became delirious, I learnt from one of his friends who came to see him that he had been in the habit of taking ten or twelve pints of porter daily, besides spirits. I immediately sent for some porter, which he drank with great eagerness; and in the course of an hour after, he fell asleep. He slept several hours, and awoke perfectly composed and sane; the porter was continued daily, with a few ounces of wine; the sloughing of the stump stopped, and he rapidly recovered.

Charles Gordon, æt. 40, applied at the surgery of St. Thomas's Hospital for advice, on account of severe inflammation of the arm, which had arisen from a slight contused wound on the elbow. On examining the arm I found that inflammation of a phlegmonous character, attacking the cellular tissue, extended from the carpus to the shoulder; this had produced excessive constitutional suffering; his tongue was very foul, his bowels affected with diarrhœa, his pulse very rapid, his countenance anxious, his skin hot and dry. I had him immediately admitted into the hospital, and ordered medicines to allay the constitutional irritation, and to check the diarrhœa; nevertheless in the evening he became delirious. On the following morning I learnt that he had been accustomed to take considerable quantities of spirits daily; in consequence of which I directed he should have some gin (his favourite liquor). Soon after taking the first quantity he became much more tranquil; it was, therefore, repeated, and produced as good effects as the porter in the former case.—T.

all the upper arm was in a highly inflamed state; gangrene commenced on the Sunday ; on Monday I was asked to visit him ; he was delirious, had hiccough, subsultus tendinum, and died on the Tuesday morning. When examined after death, a large portion of the integuments of the arm was found in a mortified state, with extensive suppuration in the cellular membrane ; but the vein which had been opened was uninfamed.

Case.—Another remarkable case occurred in a brewer's servant, who, in removing some casks on a Saturday, had a small splinter of wood forced under the thumb nail ; at the moment he did not regard it, but the same night awoke in considerable pain, and requested his wife to rise and to make a poultice ; this he applied, but it did not afford any relief ; on Sunday he became worse ; Tuesday his hand was much swollen, and the pain had extended up the arm ; on Thursday I was requested to see him, and on examination found that matter was formed in the hand ; I made an opening with a lancet near the part where the splinter had entered, when a large quantity of pus was discharged ; the patient appeared much relieved ; but upon hearing a noise as I was about to quit the room, I looked round : by a convulsive effort the man had raised himself in bed, but immediately fell back and expired.

Case.—An instance apposite to those just mentioned, is furnished in the case of another brewer's servant, showing how great an injury may be sustained without producing any violent constitutional irritation. The wheels of a dray passed over this man's arm, producing a compound fracture of the bones composing the elbow joint; the integuments were much lacerated, and an extensive wound communicated with the joint. The patient, who was admitted into Guy's Hospital, would not submit to have the arm amputated, although strongly urged to do so. The injured parts were, therefore, dressed by the surgeon, who was surprised at the man's speedy recovery, without any unfavourable symptoms : thus an injury, which in one person would be attended with the most dangerous effects, will in another produce little constitutional derangement ; and the same person may at one period suffer but little from a wound, which at another time may give rise to fatal consequences : thus many of the gentlemen who come from the country for the purpose of following their professional studies at the London hospitals, on their arrival in the autumn, have but little constitutional irritability, and would suffer but in a trifling degree from severe injury ; but in the spring, after having spent a considerable portion of their time in the dissecting-room, and in the wards of the hospital, constitutional irritation is easily excited, and an injury which in the autumn would not have produced any inconvenience, creates excessive constitutional suffering, and is perhaps attended with fatal effects. It is on this account that punctured wounds inflicted in the dissecting-room, often produce such distressing effects; though it may, in some instances, arise from the absorption of morbid matter, which usually produces the most aggravated form of constitutional irritation.

Gentlemen cannot, therefore, be too careful in the use of the dissecting instruments ; as carelessness in this respect has, in some cases, occasioned the loss of several valuable lives, and in others tedious suffering, and irremediable defects in the limbs.

That the distressing and often fatal effects arising in many of these cases, depends more frequently on the state of constitution, than on the absorption of a morbid poison, is evident from their rare occurrence in the early part of the season, although perhaps more wounds are inflicted on account of the gentlemen not being so expert in the use of their instruments, from want of practice : it also frequently happens, that of several gentlemen occupied in dissecting the same subject, two or more may receive wounds, but only one suffer from constitutional irritation ; or they may be affected in different degrees, as the following case will prove. A man having died in Guy's Hospital, from the effects of severe injury to the pelvis, by which one of the ilia had been fractured, was removed after his death, by his friends, to Hackney. Permission being obtained to examine the body, my two apprentices, Mr. Callaway and Mr. Tyrrell, with a Mr. Scott, then a dresser at Guy's Hospital, went to Hackney, at my desire, and inspected the body. During the examination, each of them received several wounds from the numerous spiculæ of fractured bone. A day or two after Mr. Callaway had matter form in the theca of one of his fingers, which produced considerable constitutional suffering, and enlargement of the glands in the axilla ; the abscess in the finger was opened, and with great care and attention to his general health, he recovered in a few weeks. Mr. Tyrrell did not experience any inconvenience from the injuries he received ; but Mr. Scott, on the contrary, suffered from the most aggravated form of constitutional irritation : he had abscesses in the thecæ, of the tendons in the hand, and in the absorbent glands, at the elbow, and in the axilla ; he was delirious for some days, and did not perfectly recover for many months, during which time he suffered extremely.*

Climate.—That warm climates increase irritability, and diminish the vital powers, is shown by the proneness to tetanus in such climes, and by the danger of operating on persons visiting this country, the inflammation following them, often becoming erysipelatous ; and the most simple sore frequently becoming irritable, and disposed to gangrene. Mr. Elcock, a West Indian, pricked his finger in sewing up the body of a man recently dead : this was at twelve o'clock on a Monday ; at night he spoke to me, when at Lecture, of a pain in his finger and arm ; and I advised him to mention it to Dr. Haighton, with whom

* There is much difference of opinion in respect to the origin of constitutional irritation in these cases, whether it arises from the absorption of poison, or from a previously deranged state of the constitution. Those who advocate the former opinion recommend the early application of escharotics, with a view to destroy the action of any morbid matter introduced into the wound. As far as my own experience goes, I believe the latter opinion to be correct, and therefore strongly condemn the use of caustics ; the employment of which (if this opinion be correct), instead of preventing mischief, augments it, by increasing local affection.—T.

he lived. On Tuesday he was in considerable pain, which extended up the arm, and he had high febrile symptoms. On Wednesday he was delirious, and died during Wednesday night, or early on Thursday morning.

Causes of Death.—Injuries producing fatal consequences destroy life in three different modes. 1st. When slight, by keeping up a continued constitutional irritation, they gradually wear out the system. 2dly. When more severe, they destroy by occasioning excess of action. 3dly. The most severe, by shock to the nervous system, cause death, without reaction. Thus I have seen a person admitted into Guy's Hospital, who had a laden wagon pass over his knee: the bones were crushed, but there was no wound or hæmorrhage, yet the person died in a few hours after his admission. I have also seen a man, who fell into a vat of hot beer, by which both his lower extremities were scalded, but the body escaped any direct injury. This man's pulse was very small and feeble; his skin was cold; his teeth chattered; no reaction took place, and he died in eight hours, notwithstanding stimulants were freely given. I have known a limb amputated, for compound fracture, above knee, and the patient die in four hours after, without any reaction; the body was covered with a cold perspiration, and the pulse was scarcely perceptible.

Case.—I amputated a man's leg above the knee, in consequence of a shot through the upper part of the tibia. During eight hours after the operation, the pulse was with difficulty perceptible; at ten hours it was 90, and very small; at thirty hours he was vomiting, and had no evacuation from the bowels, his belly was tense, the pulse was 114, and small: at fifty-four hours the pulse was 120; he was still vomiting; costiveness, and abdominal tension; no appetite, and his skin hot: at sixty-eight hours his pulse was feeble, and 140 in a minute; the tongue had a brown fur in the middle, and was white at its edge. He had still vomiting, costiveness, and delirium: at eighty-one hours he died. The stump was in part gangrenous, and in part had the appearance of an amputation, performed only a few minutes before.

Continued Irritation.—Irritation in chronic diseases, or continued irritation, exhibits symptoms somewhat different. There is a chilliness succeeded by heat, sometimes once, at others twice, in twenty-four hours: the tongue has a white fur, or is unnaturally red and smooth, as if deprived of its cuticle; a loss of appetite, with occasional vomiting; an irregular state of the bowels, obstinate costiveness is succeeded by profuse diarrhœa; the urine is smaller in quantity than usual; the skin is sometimes hot, so as to be parched and dry; at others, copious perspiration attends, especially during the night, so as to oblige the patient to change the linen in the morning; the pulse is quick, from 90 to 120 in a minute; the respiration is difficult and hurried, and often attended with a slight cough; the sleep is interrupted; the mind is irritable; and the patient is at length worn out, by an action which is exhausting, from its continued frequency, rather than its violence.

Dissection after Death from Irritation.—In dissecting those who die from irritation little is found to explain the cause of death. In children who die from scalds there is more blood than usual in the vessels of the pia mater, and a greater determination of blood to the spinal marrow. In children dying from the irritation of teething, there is an effusion of from two to five ounces of water in the brain. In an adult dying from irritation, we have several times seen patches of cartilage and bone upon the pia mater of the spinal marrow.

Treatment.—The treatment of irritation being much the same as that required in inflammation, I shall give now but a short description of it.

Local.—When constitutional irritation arises from a local cause, the remedies must be chiefly directed to the source of the irritation; if possible, at once to remove it, or to lessen its effects on the constitution; but, on the contrary, when local disease is either promoted or aggravated by a deranged state of constitution; then the remedies must be in great part constitutional; for as the general health is improved, so will the local affection disappear.

Case.—A short time since, a case of compound fracture was taken into Guy's Hospital: in which at first nothing untoward occurred; but, after a short time, the patient's constitution suffered so severely, that his life was despaired of: a probe was passed into the wound, and a loose portion of bone was discovered pressing against the tibialis anticus muscle; the wound was dilated with a scalpel, and the detached portion of bone was extracted; immediately the constitutional irritation began to subside; he rapidly regained his former vigour, and was shortly discharged cured. Another patient was admitted into St. Thomas's Hospital, for simple fracture at the upper part of the tibia, which was soon succeeded by violent irritation of the whole system, and formation of abscess at the seat of fracture. The limb was amputated in consequence, and, when examined afterwards, it was found that the tibia had been broken into several small portions, which had been acting as extraneous bodies, and had caused all the local and general mischief; the patient quickly recovered from the operation. These cases are sufficient to show the necessity of seeking the cause of irritation, and the importance of its removal.

Constitutional.—Constitutional irritation must not be too suddenly subdued or entirely destroyed, as a certain degree of irritation evinces that nature is endeavouring to accomplish the restorative process; keep it therefore within bounds, carefully watch its progress, and, if necessary, check its violence, but do not entirely destroy it.

Means.—There are two means of reducing irritation.

Restoring the Secretions.—First, by restoring the secretions of the different organs, and, by thus opening the outlets, lessen fever. A man who has his skin hot and dry, feeling excessively heated, if you can produce a free perspiration, will immediately be relieved and become cool. When the irritation is severe, you must not limit your medicine to act on any particular organ, but try to restore all the se-

cretions: and this is best effected by administering mercurials to act on the liver, aperients on the intestines, diuretics on the kidneys, and antimonials on the skin.

Lessening the Irritability.—The second mode of relieving irritation is by allaying the excitement of the nervous system; this can be effected by giving opium and antimony combined; or calomel, antimony, and opium, to act on the skin or liver as well as the nervous system: the latter is one of the best medicines for allaying irritation, and may be given to adults in doses of two grains of calomel, two of antimonial powder, and one grain of opium: to this you may add saline medicine, for they promote the secretions and lessen the irritability of the nervous system. *Liquor ammoniæ acetatis* with *tinctura opii*, and the common saline with opium, soothe the system into peace. The alkalies, as potash and soda, diminish the irritable actions of organs, as may be seen in irritable bladder. *Hyoscyamus* and *conium* are also excellent remedies, especially in those persons with whom opium disagrees.

Bleeding.—The abstraction of blood lessens the momentum of the circulation, and prevents the danger of congestion in any of the vital organs; but it must be taken away with the greatest care, not to diminish too much the powers of the constitution. A man was taken into Guy's Hospital, having a concussion on the brain; the dresser, who admitted him, was a great admirer of venesection, and consequently bled the patient frequently, and in large quantities; in ten days the man died. On examining the head after death, a very slight laceration of the brain was discovered, but no attempt at restoration: the continued abstraction of blood had deprived nature of her restorative powers. In compound fractures it is extremely dangerous to bleed largely; as, by lessening the power of the constitution too much, there is not sufficient energy to perform the task of reparation.

If an important disease exist, nature will not always have power to perform the necessary duty of restoration. A man was admitted into St. Thomas's Hospital, under Mr. Cline, for a simple fracture of the os humeri; the fracture did not unite, and scarcely any inflammation arose: on the twenty-ninth day the man died suddenly. Upon dissection an aneurism was found in his aorta, which had burst: very little if any change had taken place in the fractured part.

Treatment of Chronic Irritation.—When there is chronic irritation, you can only restore the system to healthy action by slowly acting on the secretions; to produce these diseases, some slow feverish action has existed, and some one of the secretions has been lessened; the skin is dry, or the bowels are costive; the bile is not properly secreted, or the urine is less abundant; hence the blood is locked in the system, and congestion, followed by inflammation, produces local diseases. The *pil. hydrarg. submur. comp.* is the best remedy under these circumstances, as it increases the secretions of the liver, intestines, kidneys, and skin. The blue pill, or calomel, should be followed by an aperient in the morning, as they act on the liver, but not in proportion

on the other secretions. To attempt to cure such diseases suddenly, or by violent and active means, must be ever improper ; a chronic treatment is required, and by slow degrees only can you restore the body to a healthy state. Let me repeat, *all the secretions must be restored, as this is the grand principle in the cure of disease.*

On the Influence of the Mind upon the Body.

The influence of the mind on some of the functions of the body, in a state of health, is well known : grief producing an immediate secretion from the lachrymal gland, as is evinced by a flow of tears ; and fear occasioning an abundant secretion of urine, compelling the person to discharge it frequently ; on some occasions, the same feeling produces a copious secretion of bile followed by jaundice. In disease, the influence of mental impression requires great circumspection on the part of the medical attendant. A tranquil or a cheerful state of mind, under accident or disease, greatly contributes to the patient's recovery ; and those who are accustomed to witness a patient in the first few hours after he has received a severe injury, augur, from his manner, the probability of recovery. If he submit himself to his fate, without repining ; if he yield himself to the advice of his friends, and readily consents to all that is proposed for his relief, he generally does well ; but if, on the contrary, he bitterly laments his fate, or his mind is even too actively engaged in suggesting the means of relief, impatient in their not being immediately obtained, being officious in trying to assist, anticipating every desire, such a person has a degree of constitutional irritability highly unfavourable to his recovery. It is the surgeon's duty to tranquilize the temper, to beget cheerfulness, and to impart confidence of recovery. Some medical practitioners are so cold and cheerless as to damp every hope ; whilst others inspire confidence of recovery, and a disregard of situation, which supports the regular performance of all the actions necessary for restoration. It is your duty, therefore, to support hope, to preserve tranquillity, and to inspire cheerfulness, even when you are still doubtful of the issue.

Grief.—Grief has great influence in producing disease, and in preventing recovery ; it lowers the actions of the body, arrests the secretions, particularly that of the liver, and at length produces a slow feverish state. The two worst forms of disease to which the human form is liable (cancer and fungus) are frequently produced by grief and anxiety : how often have I known a mother watch her child in anxious suspense, under a long-continued disease ; and although, at length, gratified with its recovery, has soon after perceived a tumour in her breast, which become the cause of her own destruction : on the other hand, a mother, bereft of all she dearly loved, under the grief arising from her loss, has an incurable disease produced, which soon terminates her life of sorrow. In the treatment of accidents, grief often so depresses the system, as to destroy all the efforts of restoration.

Anger.—Anger has the effect, frequently, of disturbing the healthy actions of the body, and of retarding the progress to recovery. I was attending a man who had an ulcer, which I had several times brought to a healthy state ; but, when I had given an opinion that it would soon be cured, I found, on the following day, when I saw the patient, that the sore was irritable and inflamed, and that I had my labour to begin again. This occurred several times ; at length I was informed, that my patient was exposed, in his family, to sources of great mental irritation ; I therefore directed him to take an apartment distant from the causes of angry excitement : and he then, under the same treatment, recovered without any further relapse.

Fear.—But fear has the greatest influence in destroying your best efforts to cure injuries or diseases. Often have I known patients declare, after an accident, that they were sure they should not recover ; and they seemed to be deprived of all restorative power. Not long since, a person came to me from the country, and described his symptoms, which induced me to believe that he had a stone in his bladder : I sounded him and found a stone. When I informed him he had the stone, he said, “ I hope not, for I can never submit to an operation.” I prescribed some medicine for him, and he returned into the country, where he died in a few days after.

During the period of my residence with Mr. Cline, a lady consulted him for a tumour in her breast, which he recommended to be removed. She said, she was sure that the operation would kill her ; but it was observed, that the removal of such a tumour was generally attended with little danger. Although unwilling to submit, and strongly impressed with the idea that the operation would be fatal in its issue, her friends prevailed upon her to consent : and, when I mention Mr. Cline as the operator, it is unnecessary to say, that it was done with all that skill and caution could effect. She died on the same day, only an hour after the operation ; and it was found, that she had arranged her family and domestic concerns in such a manner, that no confusion should arise from what she thought her inevitable doom.

Case.—A child, for some trifling offence, was put, by its school-mistress, into a dark cellar : the child was dreadfully frightened at the idea of being put there, and cried violently during the hour that it was confined. When she returned to her parents in the evening, she burst into tears, and begged that she might not be put into the cellar ; the parents thought this extremely odd, and assured her that there was no danger of their being guilty of so great an act of cruelty ; but it was difficult to pacify her, and when put to bed she passed a restless night. On the following day she had fever, during which she frequently exclaimed, “ Do not put me in the cellar.” The fourth day after, she was brought to my house in Broad Street, in a high state of fever, with delirium, frequently muttering, “ Pray do not put me into the cellar !” and when I inquired the reason, I found that the parents had learnt the punishment to which she had been subjected. I ordered what I conceived likely to relieve the fever, but the child died in a week after this unfeeling conduct.

The following is also a curious example, given in the words of a child, aged ten years. "I wanted to write my exercise, and to scrape my slate pencil, and went into the school in the dark to fetch my knife; when one of my school fellows burst from behind the door, to frighten me. I was exceedingly terrified, and it made my head ache. On the following day I became deaf; and, on the next, so deaf as not to hear the loudest talking."

In this state she continued in June 1824, three months after having been frightened; at which time I saw her. She had been previously under the care of Mr. Hodgson, of Birmingham.

LECTURE II.

ON INFLAMMATION.

The Restorative Principle.—INFLAMMATION is the means by which local injuries are repaired, and it may be therefore considered as the restorative principle. Its presence is usually indicated by the four following signs; viz. 1st, by an unnatural redness in the inflamed part; 2d, by pain; 3d, by increased heat; and, 4th, by swelling: these marks of inflammation admit of a very ready explanation.

Redness.—1st, Redness: that this arises from an increased determination of the red particles of the blood into the part, may be distinctly seen, when inflammation is superficial, as in the tunica conjunctiva of the eye; and that it is the result of a dilated state of the vessels is readily ascertained by injecting parts, in which the vessels are naturally of small diameter, as the injection in inflammation easily passes into vessels, which would not before have received it; as, for example, by the injecting an inflamed peritoneum, pleura, or tendon, which is a part naturally possessing but little vascularity.

Sensibility.—2d. Increased sensibility arises from the extension of the nerves, by the greater quantity of blood determined to them. Parts naturally endowed with little sensibility are quite the reverse when in a state of inflammation. I was called, a short time since, to a case in which it was necessary to saw off a small piece of the tibia, after a long continued compound fracture; during the operation, a cavity was opened, in which was a small spicula of bone, embedded in a granulation: the latter was extremely sensitive; the extract of belladonna was applied to it, and gave immediate relief: indeed, bones, though nearly destitute of sensation in their healthy state, are sometimes extremely sensitive when inflamed.

The degree of suffering in an operation is greater or less according to the absence or presence of inflammation.

Not only is the sensibility of a part increased, but its irritability is exceedingly augmented by inflammation. If any hydrocele be injected when inflamed, it suppurates instead of adhering: and if amputation be performed through an inflamed part, the stump scarcely ever unites by the adhesive process, but passes into a suppurative, and sometimes a sloughing state. An intelligent surgeon, therefore, generally avoids cutting into an inflamed part, from the great pain which it inflicts, and from the restorative process being difficult, on account of the great irritability of the inflamed surfaces.

Heat.—3d. Increased heat:—Mr. Hunter denied this: he made an incision, two inches deep, in the gluteal muscles of an ass, and into the wound he introduced a tin canula, $1\frac{1}{2}$ inch long, so that there was half an inch below the canula; he then passed a plug of wood through the canula to the bottom of the wound, and confined it there, so as to prevent a union of the muscles; this was on a Wednesday. Immediately after the wound was made, a thermometer was introduced into it, and the mercury rose to 100° exactly, as another did at the same time, which had been passed into the vagina. On the next morning the plug was taken out, and the ball of the thermometer introduced to the bottom of the wound; the mercury rose to 100° : the plug was then again returned, and secured as before. In the evening the experiment was repeated with the same result. On Friday morning, the thermometer, when introduced, rose to 99° only; and, in the evening, it rose to $100\frac{1}{2}^{\circ}$. On Saturday morning, when introduced again, the mercury reached 99° : in the evening 100° .

Similar experiments were made on dogs, with the same results.

It appears also by Mr. Hunter's experiments, that the temperature indicated by the thermometer, when inflammation was excited in the rectum or vagina of an ass or a dog, was not greater than that existing in a healthy state of those parts.

But although no increase of heat is evinced in internal inflammation, yet when the inflammation is seated on the surface of the body, in which the temperature varies much, and is below 98° , an alteration sometimes of seven degrees takes place; as on the inside of the thigh, on which a blister was applied, the thermometer rose to 90° , whilst on the inside of the opposite thigh it only reached 83° : in another instance it rose only 4° , but in every experiment the temperature was increased.

Swelling.—4th. Swelling—Is occasioned in part by an increased determination of blood to the diseased spot, distending the vessels; but it also depends on effusion of the fibrin of the blood, which, in coagulating, separates a serum into the surrounding cellular tissue.

Inflammation has four terminations.

Adhesion.—1st. In adhesion. This arises from fibrin being thrown into the cellular membrane, and the parts becoming glued together by it. It had been supposed that it was albumen which was poured out in inflammation; but in examining this subject with care, it is found that the character of the effused substance in all respects, resembles

the fibrin of the blood, and by this substance are the edges of the divided parts reunited.

Suppuration.—2d. Suppuration or secretion of pus. This is composed of particles nearly similar to those of the blood, only differing in colour, swimming in a fluid resembling serum, and coagulating, as serum does, when exposed to the influence of heat.

Ulceration.—3d. Absorption or ulceration, which arises from an increased action of the absorbent vessels, produced by pressure united with inflammation, by which the constituent parts of the body become partially absorbed.

Gangrene.—The 4th effect is the destruction of the life of the inflamed part. From excessive action the arteries are first enfeebled, and then their vitality is destroyed; the blood coagulates in them, and gangrene of the part is produced.

Constitutional Effects.—These are the local effects; and the constitutional, which accompany them, are the different symptoms of irritation mentioned in the preceding Lecture.

Inflammation of Textures.—Inflammation produces different results, as it is seated in the various component parts of the body. When seated in the skin, it usually becomes extensive, because the surface is unbroken. Its colour is very florid; it separates the cuticle in the form of a vesication, which usually contains serum, but also, in some cases, fibrin; a serous effusion is also produced by it into the subjacent cellular tissue. In some instances, it is preceded by fever; in others, produces it. The skin is also liable to eruptions of various kinds; some acute, others chronic; some constitutional, others local only; some devoid of any infectious quality, others strongly possessing it.

Cellular Membrane.—In the cellular membrane inflammation produces an infusion, which obliterates or fills its cells; if it proceeds, it occasions suppuration and produces an abscess, the contents of which are discharged by the process of ulceration. In debilitated irritable constitutions, inflammation kills the cellular tissue, and produces carbuncle, which is a sloughy abscess in the cellular tissue: when chronic, it occasions tumours of various kinds, as the steatomatous or adipose; or, under peculiar circumstances, those of a malignant nature, as scirrhus, fungus, &c.

Fasciæ mistaken for Erysipelas.—Inflammation of fasciæ is generally extensive, from the large surfaces they present; they are often seen inflamed in compound fracture, producing redness of the skin to a considerable distance, and it is a very unfavourable sign in this accident. When matter is produced by inflammation of this texture, and is seated under it, great irritative fever succeeds, until it be discharged; as, for example, in the palms of the hands or soles of the feet.

Muscles.—Muscles are known to be in a state of inflammation by the spasmodic twitchings which accompany it; for instance, in a few hours after a simple fracture, when the limb has been carefully ad-

justed, it becomes disturbed by involuntary convulsive catchings, occurring when the patient is going to sleep, or awaking from rest.

Tendons.—Tendons are apt to inflame to great extent. They do not easily inflame; but when they do, for example, in the finger, the fore arm swells, is red, and matter forms in the course of the tendon, which sloughs to its junction with the muscle, in some cases; but in all to a greater extent than the surrounding soft parts. Punctured wounds of tendons are apt to produce tetanus, more than wounds of other parts of the body. Matter formed under tendons burrows to a great extent, and produces violent irritation, as under the tendon of the occipito frontalis muscle, and under the covering of the temporalis.

Absorbent.—Inflammation in the absorbent vessels is marked by red lines being formed on the skin in the course of these vessels, from the skin participating in the inflammation, they form hard cords from the effusion which surrounds them, and knots are felt in these cords from the enlargement at their valves. Their glands generally partake of this inflammation, and both the vessels and the glands occasionally suppurate. They more frequently inflame from common irritation than from the absorption of poisons.

Arteries.—The arteries rarely inflame, excepting from wounds or ligatures. Inflammation in them sometimes extends even to the heart, when a ligature is applied on one of them in a person of bad constitution. I was present when Mr. Cline opened the body of a man who had a ligature put on his femoral artery near the groin, and who died at the end of the second week from the operation. The internal surface of the artery was inflamed, as also that of the external and common iliacs; and the aorta had a florid redness on its inner surface, as far as the valves of the heart.

Case.—A man, whose leg I had amputated, had a low muttering delirium, in which he rose from his bed and stood on his remaining limb; great irritative fever followed, and, what I have generally observed in inflammation of the blood-vessels, pain in bending his different joints, from its changing its position of the vessels. He died; and when I opened his body I found suppuration in the artery, for the space of two inches, above the ligature on the femoral, and inflammation of the inner coat of the arteries, in the parts in which I examined them.

Veins.—Veins, inflamed from wounds, form hard and broad cords, extremely tender to the touch, and if from bleeding, from the wounded part to the axilla. I have seen several patients die from this cause; and in the greater number the bleeding was required for dyspnoea. Upon examination, the inner coats of the veins are found adherent, and I have seen suppuration in the vein; and once an abscess in the longitudinal sinus of the dura mater (which is a vein in function), of which we have a beautiful specimen in the anatomical collection at St. Thomas's Hospital. When veins inflame from ligatures, they generally do so more below the ligature than above it, and excessive distension, from the interruption to the return of the blood, seems to be

the cause of this circumstance. I have seen several persons die from ligatures being put on one of their veins, and the appearances on dissection were excessive distension from accumulated blood below the ligature: adhesion above the ligature, and a red internal surface extending towards the heart.

Nerves.—Nerves are very rarely inflamed; but when it happens, the pain is excessive, and there is a tingling feel in the parts to which the nerve is distributed; but there is no redness of the skin, although great tenderness to the touch. Wounds of nerves, though dreadfully painful at the moment, are followed by little irritation. The wife of a medical gentleman was obliged to have the posterior tibial nerve divided, which I did in the presence of Mr. White, surgeon to the Westminster Hospital, for a painful tumour on the nerve: although the operation was dreadfully painful, and the pain shot through the brain, spinal marrow, and the nerves proceeding from it, yet it did not affect the nerves of the grand sympathetic, immediately or remotely, or produce any serious irritative fever. I have also had occasion twice to remove portions of the sciatic nerve, and but little constitutional irritation followed. Severe pain takes place sometimes in the course of the nerves; but whether it be from inflammation or not, I have not been able to ascertain by dissection. When the pain is excessive, it is called *tic douloureux*. I am inclined to believe that this disease is not inflammatory, from the stimulant nature of the remedies which are found most efficacious in it, as carbonate of iron, bark, and arsenic.*

Ligaments—Ligaments, like tendons, are not very prone to inflammation in healthy constitutions; but the synovial membrane, which lines them, is highly so, and the inflammation has great tendency to the suppurative process. In scrofulous persons, the synovial surface becomes inflamed, and the ligament covering it thickens, so as to produce great enlargement of the joint.

Cartilages.—Cartilages in joints ulcerate from inflammation, and often become entirely destroyed.

Bones.—The bones being composed of a cartilaginous substance (like that which supplies the place of bone in the very young subject,) and of phosphate of lime, and the former having arteries, veins, and absorbents entering into its composition, is, like other parts of the body, liable to inflammation, which produces adhesion of bone to bone; and in fractures, the adhesion or union of the broken portions: in suppurative inflammation, abscesses; and by ulceration is the matter dis-

* I have seen an affection of a nerve very similar to *tic douloureux* produced from injury: it was in a French officer, who had been shot through the leg at the battle of Waterloo: the anterior tibial nerve was wounded, and after the part had cicatrized he became subject to excruciating pain in the course of the nerve to its sentient extremity, whenever he put the muscles in action by attempting to walk; or it might be produced by irritating the surface of the integuments immediately over the distribution of the nerve. Various forms of counter-irritation, and also different constitutional remedies were tried, without affording relief. He would not submit to excision of the diseased portion of nerve, and left Brussels still suffering severely from this affection.—T.

charged : death, or mortification of bone, is also the frequent result of inflammation ; and the dead bone sloughs, or exfoliates, whilst new bone supplies the place of that which is removed, or is to be separated.

Membranes.—Exhalent membranes, when they inflame, are naturally disposed to adhere: whilst mucous surfaces, under inflammation, pass into the suppurative inflammation. This circumstance was first clearly explained by Mr. Hunter, and since has been dilated upon by Bichat.

Healthy Inflammation.—Inflammation is healthy or unhealthy ; it has been too much regarded as a disease, for no wound can be repaired without inflammation ; even the little puncture, made by the lancet in bleeding, would inevitably destroy life if this salutary process did not prevent it. A slight inflammatory action throws upon the edges of the wound adhesive matter, by which they are permanently united and the divided parts closed. So, when a ligature is put upon an artery, unless inflammation supervened it could be of no use in preventing secondary bleeding ; the first thing nature does in this case is to form a clot of blood in that part of the vessel which has been tied, inflammatory action succeeds, adhesive matter is thrown out, and the clot of blood is united to the internal coats of the artery so as to prevent a hæmorrhage when the ligature separates. Should the constitution, however, be unhealthy, this process would not be completed ; and when the ligature separates, the person sometimes dies of hæmorrhage. Of this we have an excellent specimen in the collection, taken from the stump of a person who died of hæmorrhage. The clot within the vessel adheres to it on one side but not on the other. Inflammation in a healthy constitution, is a *vis medicatrix naturæ*, established for the purpose of restoration ; but the inflammation which arises without any obvious cause, is an evil without any corresponding advantage ; it is of an unhealthy kind, and arises from an irritable constitution, and from the enfeebled state of the affected part.

Acute or Chronic.—Inflammation is either acute or chronic. The first passes through its stages with rapidity, while the latter is exceedingly slow in its progress. The chronic is either the result of acute inflammation, or is owing to a peculiar state of constitution ; as that which occurs in persons who have lived intemperately, or in those who have been exposed to excessive and laborious exertion, or who are the victims of anxiety and of disappointment.

Acute.—One of the best examples of acute inflammation is seen in the breast after lying-in ; the adhesive stage is marked by hardness and pain. The suppurative, by irritative fever, fluctuation, and throbbing or pulsation ; ulceration usually quickly succeeds, and the matter is soon discharged.

Chronic.—The termination of acute inflammation in chronic, is well seen in ophthalmia. When consulted in a case of this description, during the acute stage of inflammation, you will take away blood, both locally and generally. This may be done either by opening a vein in the arm, by the application of leeches to the *palpabræ*, or by opening

the temporal artery, or arteries, which sometimes relieves from its free anastomoses with the ocular vessels.* The local applications should be such as soothe and allay local irritation, for which purpose emollient and narcotic fomentations are most appropriate. When by such means the acute inflammation has been subdued, it frequently happens that the chronic begins. In the acute stage, our object was to decrease power, but now it is required to stimulate the vessels, to contract their diameters, to diminish the quantity of blood which has accumulated in them, and thus restore them to their natural state, and this is best effected by astringent and stimulating lotions; as the solutions of alum, sulphate of zinc, nitrate of silver, &c.; and as the depletion necessary to check the acute form of the disease, may have produced general debility, medicines will be required to increase the tone of the stomach and to give vigour to the circulation.

Another example of chronic inflammation succeeding the acute may be witnessed in gonorrhœa; at first it is necessary to check the violent action in the vessels of the urethra, but you are afterwards obliged to excite action by giving the balsam of copaibæ; and frequently slight stimulating injections are employed in this stage of the disease.

Common or Specific.—Inflammation is common or specific.

The first, with its terminations, has been already described, and is called healthy inflammation. But the second, or specific, is a peculiar kind, and is always unhealthy.

Specific.—In specific inflammation the vessels have a different action to the healthy; and thus, the fluids and solids which they produce have not the usual character.

There are two descriptions of specific inflammation; one produced by a peculiar condition of constitution, and the other by the application of a poison. Gout is an example of specific inflammation. If a man, for a length of time, yields to every kind of injurious excess, loading his stomach with food and wine, so as to weaken the digestive powers, he will probably excite what is called the gouty disposition; he experiences dreadful pain in one or more of his joints; severe inflammation appears, which terminates in the secretion of a matter, becoming solid, usually called chalk-stone; the name, however, is incorrect, as it has been proved by the analysis of Dr. Wollaston to consist of uric acid and soda; consequently is now named urate of soda.

The formation of scirrhus, or cancer, is another example of specific inflammation, arising from a peculiar state of constitution. Let us

* I have frequently observed, that the abstraction of considerable quantities of blood from the temporal artery, in cases of severe ophthalmia, has produced little or no relief. On mentioning this to other gentlemen who are in the habit of treating ophthalmic diseases, I found several of them had remarked the same circumstance, which may be accounted for in the following manner:—The branch of the temporal artery generally opened is the frontal branch, which anastomoses with the super-orbital; and the usual method of stopping the flow of blood is to divide the branch which has been punctured, thus the anastomosis is cut off; and the blood, which before passed off in part by the divided vessel, is thus determined to the affected organ.—T.

suppose that two women receive each a blow on the breast, one with a healthy and vigorous constitution, and the other with a system worn down with care, anxiety, and disappointment, and in a constant state of chronic feverish excitement, in which the secretions are imperfectly performed, and is thus predisposed to the formation of cancer : in the first individual, the inflammation produced will be strictly healthy, going through its different stages, until the cure is accomplished ; but in the other, owing to constitutional peculiarity, the same extent of injury will produce cancerous disease ; an affection over which all remedies, hitherto tried, have little control, and extirpation is but an uncertain mode of relief. The fungous disease, called by Mr. Hey fungus hæmatoides, and by others named soft cancer, pulpy tumour, &c., is in some respects similar to the former in its cause, but different in the action of the part, and in the effusion by which it is followed.

But the best example of specific inflammation is scrofulous. Persons subject to this peculiar form of inflammation have generally very fair complexions, and delicate appearance ; this state of constitution is engrafted at birth ; and when inflammation occurs, it is slow in its progress, although easily excited ; and the result is sometimes a secretion of curdy matter ; at others, of a thin serous fluid, resembling but little the pus which is formed in healthy inflammation.

From Poison.—The second kind of specific inflammation is that which is produced by the application of poisons. Thus, in gonorrhœa, the matter secreted is widely different from common healthy matter, having a large quantity of mucus mixed with it ; and, secondly, when applied to another mucous surface, it is capable of exciting an action by which similar matter and the same effects are produced. The matter of small-pox occasions similar results. As far as constitutional effects are concerned, it does not seem to be essential in what quantity the poison is applied ; the result in each case will depend upon the state of the constitution.

Irritable Inflammation.—There is another kind of inflammation, which I would call the irritable ; in this disorder the blood-vessels are much less affected than the nerves. You are called to attend a person, who tells you that he feels in the hand, arm, or some other part, most agonizing pain : if not experienced in these matters, you will be inclined to doubt the correctness of your patient's statement, as you cannot discover any diseased appearance of the part. Some time ago I was consulted by a lady who had this painful affection in the foot, and I employed various remedies without her being relieved : finding no improvement, and suffering in health, she went to the coast, and there used a steam bath ; and, without any further means, the pain quickly subsided. The eyes are very subject to this torturing disorder. But no part is more frequently attacked by it than the breasts of young women. It produces such a degree of tenderness, that they cannot bear the slightest pressure : the pain extends to the shoulder, down the arm, and even to the elbow and fingers, accompanied by constitutional irritation. To cure these pains, and general derangement, such

medicines must be given as will influence the secretions, but especially that of the uterus. This irritable inflammation sometimes attacks the testicles, rendering them extremely sensitive, so that the patient can scarcely sustain the pressure of his clothes. It is attended with little increase in the size of the gland. I have been obliged to remove the testicle in three persons for this disease. The subject of one of these operations was a gentleman from South Carolina : he came to England for advice, and consulted many of the surgeons in London, but without experiencing any relief of his sufferings, from the various remedies they advised. He at length requested me to remove the torturing part ; this I did, and he returned to his native country quite well. The bladder is also occasionally disordered by this irritable inflammation, and the symptoms, in many respects, resemble those of stone ; in both cases there is pain in making water, and blood is sometimes mixed with the urine. The grand difference in these two cases is this : the irritable bladder is most painful when distended ; that which contains a stone, when emptied. On dissection, the inner coat of an irritable bladder has been seen the colour of red velvet. I have known this irritable inflammation attack the rectum, and produce excessive suffering, which was relieved by large doses of soda.—Soda, rhubarb, and the compound powder of ipecacuanha, are the best remedies.

Cause of Inflammation.—Inflammation sometimes arises from debility, and this state is frequently seen in the lower extremities of old persons in whom the blood returns to the heart with difficulty ; from weakened power, the arteries are called upon for unusual exertion, and inflammation of the skin succeeds, frequently attended with incrustations and a serous discharge, and sometimes with a watery secretion into the cellular texture.

An irritable constitution is most prone to inflammation ; and, when produced in it, is more dangerous and extensive. Some persons are naturally irritable, others become so from disease. Thus, in fever, when the constitution has suffered much, the parts on which the body rests become inflamed and mortify. But in fractures, where the system is healthy and vigorous, although the patient remains many weeks in bed, no such effects are produced. Where there is great irritability, inflammation is always dangerous ; the application of a blister to the chest of a child, for the removal of a cough after measles, frequently, in this town, destroys life, by producing gangrene. So mercury, by rendering the body irritable, disposes it to inflammation ; and it is wrong to operate on a patient immediately after a mercurial course on account of this inflammatory tendency.*

Exciting causes.—The exciting causes of inflammation are, whatever produces an unnatural state of a part, calling upon nature for its reparation, which it effects by the process of inflammation ; as bruises,

* A young woman in our hospital, who had passed through a course of mercury, had a fatty tumour removed, and died of erysipelatous inflammation, brought on by this simple operation. A man had a musket ball extracted from his arm whilst under a course of mercury, and had severe erysipelas produced in consequence.

cuts, pressure, extraneous substances, &c. The manner in which nature repairs these injuries will hereafter be more particularly described.

The proximate Cause of Inflammation.—The state of the blood does not tend to the production of inflammation; and the opinions formerly entertained of the increased thickness of this fluid in inflammation are now known to be diametrically opposed to the fact, as the blood is rendered more than usually fluid by it.

If a part which is the subject of inflammation be examined, the following are the appearances which I observe:

The tale of the tadpole is the best transparent part of an animal for making these observations: in the web of the frog's foot the vessels are less conspicuous. When the tail of the tadpole is placed under the microscope, a surface appears intersected by rivulets of blood, in which the red particles may be seen rolling on in a most beautiful current. The part is now irritated, either by slightly wounding it, or by the application of an acid; almost immediately the velocity of the circulation appears to be increased; in a few minutes little branches of vessels appear to be growing out of the sides of those before visible, into the transparent part; these vessels are now seen receiving a red particle, or particles of blood, which gradually advance in them, forced forwards by a *vis-a-tergo*, until they reach the beginning of the corresponding vein; and then this vessel being larger than the artery, the red particles rush from the artery into it, and thus a new vessel appears to be created under the eye. It is not, however, a new vessel, but a serous artery, which, by the force of the action of the heart and of the surrounding vessels, becomes dilated, so as to receive red particles. When the red particles are observed in the vessel, they seem to advance by the pulsation of the heart, and then slightly to retreat; but not in proportion to their advance, and thus they gradually proceed.

The vessels of the inflamed part, on this account, appear to become more numerous; but it is only that they can now be seen from the difference of the fluid which they contain. They become very considerably dilated, and they seem disposed rather to yield than to contract. This is what can be with certainty observed in these animals.

With respect to man, we observe, that if a drop of nitric acid be applied on any part of the body, in three or four minutes a rush of blood takes place into the part, and it becomes red. In the parts near to that inflamed, a strong feeling of pulsation is produced, showing that the action of the surrounding vessels is increased; and the heart, sympathising with it, has the velocity and force of its action augmented.

The vessels of the inflamed part then are found to be dilated, but the arteries feeding the inflamed part are also dilated; so that if a limb be injected, in which there has been any considerable extent of inflammation, the principal vessels, as well as their branches, have their diameters increased.

Inflammation is, therefore, a dilated state of the vessels of the part, an increased action of those in the surrounding parts, and the heart sympathising with the part determines a larger quantity of blood to the dilated vessels.

Illustration.—This process may be illustrated by what is frequently occurring in the organ of vision ; a piece of iron lodges upon the eye, and becomes a source of irritation. A flow of tears is produced by the increased action of the lachrymal gland to wash away the cause of irritation. So an irritation upon other parts of the body leads to the determination of blood to the part, to remove by subsequent processes the irritating cause.

LECTURE III.

TREATMENT OF INFLAMMATION.

THIS is either constitutional, local, or both combined.

When any important organ is directly injured, or its functions disturbed in consequence of the influence of the injury upon the constitution, the treatment must be necessarily constitutional. No vital organ can be deranged in its functions, without producing a general disturbance in the system ; and this will be greater or less, in proportion to the importance of the part injured, the extent of the injury, and the nature of the person's constitution.

Bleeding.—The most powerful constitutional means of relieving inflammation is by the abstraction of blood. Its beneficial effects principally result from its producing a diminution of nervous power ; and that it does so, is proved by the syncope which it occasions. Sometimes the removal of a very small quantity of blood will occasion not only suspension of all the voluntary functions, but of the mental powers.

Its Modus Operandi.—Fainting, however, cannot be easily produced, unless the patient be in the erect or sitting position whilst the blood is abstracted ; for it is the loss of this fluid by the vessels of the brain, which is the immediate cause of fainting. To prove this, when a person faints, place him in a recumbent position, and let his head be situated a little lower than his body, to facilitate the passage of the blood to the brain, and in a very short time after being thus placed he will open his eyes, and all his faculties will return.

The second mode by which bleeding relieves, is by lessening the momentum of the circulation ; for when there is great distention of the blood vessels, the momentum will be necessarily great, and consequently the vital fluid will be thrown with great force, not only on the inflamed part, but on all the organs of the body.

Indication for Bleeding.—The indication for general bleeding is a hard pulse. In this state of pulse the diameter of the vessel is diminished, yet its action is exceedingly strong, and each pulsation feels like the vibration of a wire ; therefore, when you find this description

of pulse, you will be justified in taking away blood. The hardest pulse is that which is produced by inflammation of the heart; in inflammation of the lungs and of the brain the pulse is hard, but not equally so with that which arises from inflammation of the heart.

When the stomach or intestines are inflamed, the pulse is hard, but is often so small as to be scarcely distinguishable. Persons unacquainted with this fact are afraid to take away blood, although it is imperiously required, on account of the paleness, depression of strength, and smallness of pulse; as, for instance, in strangulated hernia. This observation also applies to peritoneal inflammation.

Quickness of pulse is not in itself a sufficient proof that bleeding is required; but when united with hardness, no additional evidence of its necessity can be wanted; therefore do not bleed when there is a quick pulse, unless, at the same time, it is hard; for a quick pulse is in itself a proof of irritability, which bleeding will increase.

The indication for a repetition of bleeding is said to be a buffy state of the blood; but your decision must not be governed by this appearance alone, for you must still have regard to the pulse.

When blood is cupped or hollowed upon its surface, it is said to be a proof of inflammation, and that bleeding should be repeated; but the following case will show, that even a cupped state of the blood, and buff conjoined with it, are not sufficient evidence that venesection may be repeated. A patient in Guy's Hospital, in the last stage of scurvy, whose blood-vessels were so weak, that a slight pressure on the skin produced ecchymosis, whose gums frequently bled, and whose pulse was exceedingly quick and feeble, had a very small quantity of blood taken from his arm as an experiment; after standing for a few hours, it became not only buffy, but considerably cupped. I had this blood preserved, on account of the commonly supposed inflamed appearance; but the blood will be buffy, and lose its red particles, in coagulating, from quickness of action only: when you contemplate a repetition of blood-letting, it may be of importance to keep this observation in your remembrance. If the quantity of serum be very large, unless there are other indications for bleeding, this circumstance is an evidence against the repetition of blood-letting.

Quantity taken away.—The quantity of blood usually taken away at one time in inflammation, in an adult, may be from ten to twenty ounces; but must vary with the degree of inflammation, the importance of the organ inflamed, and the state of the constitution.

When compared with the solids, the quantity of blood which can be drawn from an animal, before it dies, is about one part to sixteen. A small dog, weighing fourteen pounds, had its jugular vein opened; from this eleven ounces were discharged when the dog fainted; the carotid artery was then divided, and from this source three ounces more were obtained, and no more could be drawn. Thus fourteen ounces of blood were removed from a dog weighing fourteen pounds; so that one ounce of blood to one pound of solids, was the proportion drawn.

Mode of Bleeding.—When you bleed to relieve inflammation, the blood should be abstracted as rapidly as possible ; therefore, the orifice made into the vessel should be of considerable size ; for if allowed to flow slowly, the vessels have time to accommodate themselves to the diminished volume of circulating fluid ; so that the system feels but little the gradual abstraction of blood. The grand object is, to produce a tendency to fainting, and in some cases complete syncope ; to effect which, blood must be suddenly withdrawn. But in very delicate persons the loss of a small quantity of blood will subdue inflammation : a gentleman who has been for many years subject to inflammation in his lungs, is usually relieved by the loss of six or eight ounces of blood.

Case.—You may bleed, so as to produce constitutional and local effects at the same time. A patient of Mr. Forster's in Guy's Hospital, who had concussion of the brain, suffered afterwards continued pain in his head, and had considerable constitutional irritation ; blood was abstracted from the external jugular vein, and immediately the pain in the head ceased, and did not afterwards return.

When you are required to take charge of patients suffering from an injury, which demands a length of time for its restoration, you must be exceedingly careful how you take away blood from the system generally, but must in preference adopt local bleeding ; for if, as I have observed, you adopt a system of free depletion, nature will not be equal to the restoration of the injured parts, and the most disastrous consequences follow the indiscriminate employment of blood-letting. There is not a greater error than this in the practice of surgery.*

Secretions restored.—The second mode of relieving inflammation, is by restoring the secretions ; for whenever inflammation occurs, at least in a violent degree, all the secretions are diminished or suppressed. The most important secretions are those of the liver, intestines, skin, and kidneys ; and when these cease to perform their proper functions, irritative fever is the consequence. A deficiency of secretion from the alimentary canal is the cause of a great number of the diseases to which human beings are subject. The internal surface of the intestines is lined by glands ; the tube itself is on an average twenty-seven feet in length, and three inches at least in circumference ; so there are here near one thousand inches of surface, from which, in health, continual secretion proceeds. What, then, must be the result of allowing so extensive a secreting surface to remain inactive ? the production and continuance of constitutional irritation. To excite the

* A stout man was admitted into Guy's Hospital, having a simple fracture of the tibia, with considerable contusion of the surrounding parts ; a day or two after his admission, he had severe constitutional irritation, and acute pain, with spasmodic action of the muscles near the seat of injury. To relieve these symptoms, the dresser was directed to take some blood from the arm of the patient, which he did ; but thinking it proper that faintness should be produced, as a proof of its effect on the constitution, and forgetting that the patient was in a recumbent position, he abstracted so large a quantity of blood, that all power of restoration was completely annihilated and the man died.—T.

intestinal canal, and to restore its action, is, therefore, one of your principal objects; this may be done by purgatives. Purgatives afford relief in nearly the same manner as the abstraction of blood from the arm; for a pint of serum will pass off with the fæces, after taking a brisk cathartic.

Purgatives have likewise another excellent influence, independently of restoring the intestinal secretions, by carrying off whatever fæculent matter is lodged in the intestines; but I do not believe that much irritation is produced by the accumulation of fæces, in comparison with that which originates from the secretions being arrested. I have met with several cases, in which an almost incredible quantity of fæces had collected, yet it produced but little constitutional irritation. Accoucheurs frequently witness similar cases. In one instance which fell under my observation, the pressure was so violent, that it produced ulceration into the vagina; yet the enormous quantity of fæculent substance excited but little constitutional irritation; some fluid formed a passage by the condensed mass, and was daily discharged; this, in a great measure, accounts for the absence of irritative fever.

That it is from the check to secretion, that irritative fever arises, is proved by what occurs in children during dentition; they are sometimes put to bed quite well, yet in the morning, an arm, leg, or both legs are paralyzed, from the irritation of a tooth, the secretion from the intestine stops, fever is excited, and produces a hot and dry skin; but restore these secretions by administering purgatives and antimoni-als, and the irritative fever quickly subsides, although the paralysis will sometimes continue with little alteration for life.

There is another mode in which purgatives produce a beneficial effect in inflammation, by irritating the intestines; blood is determined to them, and it is abstracted from the part inflamed; upon the acknowledged principle, that two increased actions proceed, with difficulty, in the body at the same time.

Action on the Liver.—It is of little use to produce action in the intestines, unless you also excite the secretion of the liver; therefore, give mercurials with your saline medicines, as these produce secretion of bile: do not give saline aperients alone, which act chiefly upon the intestines; the best plan is, to administer some mercurial medicine at night, and a purge in the morning. An excellent purge for an adult is, one grain of calomel with four of cathartic extract, or two grains of blue pill, with three of extr: col: comp: castor oil may also be recommended; and as another safe opening medicine, you may prescribe—*Infus. sennæ* with *magnes. sulphas.*

In children, calomel with rhubarb, scammony, or antimony, may be ordered as aperients; and in addition to these means the use of injections and the warm bath are the best means of restoring the secretions of the digestive organs. An old Scotch physician, for whom I had a great respect, and whom I frequently met professionally in the city, used to say, as we were entering the patient's room together, 'Weel, Mister Cooper, we ha' only twa things to keep in meend, and they'll

searve us for here and herea'ter ; one is always to have the fear of the Laird before our ees, that 'ill do for herea'ter ; and the t'other is to keep your boeels open, and that will do for here.'

Mode of preserving Health.—The means by which I preserve my own health are, temperance, early rising, and spunging my body every morning with cold water, a practice I have pursued for thirty years; and though I go from this heated theatre into the squares of the Hospital, in the severest winter nights, with merely silk stockings on my legs, yet I scarcely ever have a cold ; should it happen, however, that I feel indisposed, my remedy is one grain of calomel combined with four of cathartic extract, which I take at night, and a basin of hot tea, about two hours before I rise the following morning, to excite a free perspiration, and my indisposition soon subsides.

Perspiration.—The next secretion we should endeavour to restore, for the purpose of relieving inflammation, is that of the skin, for it rarely happens that a hard pulse continues with a free secretion from the surface of the body. It operates by evacuation of the serous parts of the blood, and by determining blood to the surface, removes it from the inflamed parts.

The best mode of producing perspiration, to which bleeding and aperient medicines greatly conduce, is by administering the antimonial powder, with diluents; or the compound ipecacuanha powder (Dover's powder) ; the latter is apt to produce costiveness, therefore the antimonials are the best. Antimonials appear to act with more certainty when given in conjunction with small doses of mercury ; calomel and antimony, with the exhibition of the warm bath, either partially or generally, will in most cases produce the desired effect.

Urinary Secretion.—The other secretion, that of the kidneys, may be restored by giving diluents, squills, or acetate of potash.

When, after bleeding and administering aperients, the inflammation is not reduced, but the pain increases, and the pulse acquires a jerking or palpitating feel ; do not bleed again generally, but give calomel and the compound powder of ipecacuanha to lessen the nervous irritability, and to open the intestinal and cutaneous pores. I had thrice bled a very irritable patient on account of an inflammation of the testicle, yet the pain increased, and the artery at the wrist was raised with a jerk at each pulsation ; he was quickly relieved by taking Dover's powder with calomel. The inflammation in such cases is supported by the irritability of the system.

Nausea.—There is another mode of subduing inflammation, by giving a solution of tartar emetic, in small doses, so as to create a constant state of nausea. This plan is often successful in croup ; but calomel is also to be occasionally administered.

When inflammation occurs in old people, you must bleed with the greatest caution. An elderly lady, having inflamed lungs, was ordered to be bled ; the bleeding was repeated, and effusion into the cellular texture of the legs soon followed. Digitalis was prescribed for her, combined with spir. æther nitric. which reduced the inflammation, occa-

sioned the absorption of the fluid in the legs, and she rapidly recovered.

The means, therefore, which are employed to lessen or remove inflammation are those which restore the secretions, by opening the extremities of the arteries ; and thus the heart is prevented from propelling the blood with violence to any particular part of the body.

The Treatment of Chronic Inflammation.

The remedies employed, in this case, must have a slow and gradual action on the secretions. You cannot take this disease by storm ; and if your medicines act with violence, you will produce mischief instead of affording relief. The principle on which this disease is founded, is the arrest of some of the secretions ; and its successful treatment depends upon their restoration.

Chronic inflammation is frequently produced through the influence of the mind on the body ; thus long-continued grief will stop the secretion of the bile ; anxiety of mind produces disease in the breasts. But whatever is the cause of the arrest of secretion, some congestion is the result ; as enlargement of the liver, of glands, or of joints ; the formation of common tumours, or those of a specific character, as fungus or scirrhus.

In disease of a chronic kind, give calomel and opium ; and I cannot point out to you a better example of its good effects than is observable in chronic inflammation of the joints, or testicle ; in the former cases, when assisted by counter-irritation, it is by far the best remedy. The most common medicine, and probably, as a general one, the best that is administered in chronic inflammation, is the pilul. hydrarg. submur. comp. ; it acts at the same time on the liver, intestines, and skin ; and if you can succeed in restoring their secretions, the disease will disappear, and its effects will be absorbed ; for, by these medicines, in proportion as you increase the secretions, you excite the action of the absorbent vessels.

Another excellent medicine, for the cure of chronic complaints, is the oxymuriate of mercury (corrosive sublimate), dissolved in nitrous æther, and combined with tincture of bark or of rhubarb, or with the decoction of sarsaparilla ; continue it for some time, watching its effects with care, always keeping in mind that mercury, given to excess, will tend to increase rather than destroy constitutional irritation ; as sarsaparilla seems to possess the power of lessening irritability, we frequently give it with mercury, and in this combination they are administered with the greatest advantage.

Chronic Inflammation in Children.—Chronic disorders in children require small doses of the hydrag. c. cretâ and rhubarb mixed together, and given every night and morning ; this compound is exceedingly mild, and will have a particularly benign influence. In children also, one grain of the oxymuriate of mercury, dissolved in an ounce of tincture of bark, and given in doses of from half a drachm to

one drachm, twice a day, in water, according to the age and constitution of the child, is a very valuable medicine. It is said, that the oxymuriate is decomposed by the tincture of bark ; but whether it is so or not, it is attended with so many good effects, that I strongly recommend it, particularly in diseases of the mesenteric glands. Calomel and rhubarb, the hydrargyrus c. cretâ and soda, are also medicines of much power in the chronic diseases of children.

Lastly, in some cases, it is not advisable to give these little creatures mercury ; a medicine composed of rhubarb and carbonate of iron, or of rhubarb, soda, and calumba, given often and in small doses, will be more beneficial, as these act as aperients, improve the digestive functions, increase the appetite, and restore the general health, without the danger of exciting irritation at the moment, or rendering the system afterwards irritable.

The Local Treatment of Inflammation.

The nature of inflammation having been explained ; and it being understood that the vessels of the part are in a dilated state, and that those surrounding it have an increased action, I shall now speak of the local remedies. Of the application of cold to an inflamed part, as a means of checking the violence of the inflammation, or of altogether subduing it, much has been said. Cold is not a positive quality, but the abstraction of heat in inflammation affords much relief. If cold be applied to the body generally, it has the power of lessening the frequency of the pulse in an extraordinary degree. I tried this upon myself : I went out of my house one severely cold evening, when I was very warm, my pulse being 86° ; at the expiration of an hour it was 76° , and at the end of an hour more it was reduced to 65° ; it had not only lessened in quickness but in fulness. Cold will produce torpor of body and mind, by diminishing the excitability of the nervous system : in extreme, it occasions death.

Anecdote.—A curious instance of this kind occurred in Nova Scotia ; Dr. Scott had been dining with some friends, a short distance from Halifax, and they were on their return home at night, when one of the party separated from the rest, having said to a companion that he would frighten some of them by-and-by. However, they reached Halifax without seeing any thing more of him on the journey, and he had not arrived : at this the party became alarmed, and returned for the purpose of finding him ; he was discovered behind a hillock of snow, apparently asleep, in the erect position, but quite dead.

Anecdote.—Another circumstance of this kind is related in Cook's Voyages ; when some of the officers and crew of one of the ships landed at Terra del Fuego. Dr. Solander, who was one of the party, particularly cautioned them not to go to sleep, stating that it was extremely dangerous to do so in very cold situations. It happened, however, that the Dr. himself became drowsy, and it was with the greatest difficulty that his companions could keep him in motion ; and it was

only by extraordinary perseverance that they succeeded in getting him back to the ship alive.

Cold, therefore, applied generally and gradually for a length of time to a healthy person, diminishes the power of the nervous system, and has the effect of lessening arterial action, both in force and frequency.

When cold is applied locally to an inflamed part, it robs it of its heat, lessens its nervous energy, and diminishes the diameter of the vessels; it must be severe if it reduces the temperature of internal parts below 98° ; but in this climate many parts of the body, remote from the source of circulation, vary in temperature from 20° to 30° : thus, a thermometer applied to the toes when they are cold, will be found to indicate 20° less of heat than when it is applied to the calf of the leg. Cold applied to excess destroys life by the great abstraction of heat, heat being necessary in a certain degree for the support of the vital actions.

Thus, in the living body you may apply cold to a part until it becomes actually frozen. Mr. Cline and Mr. Sharpe were once attending a patient who had a strangulated hernia; to assist the reduction of which they applied ice, enclosed in cloths, and this they continued for thirty-six hours; as the ice dissolved, the parts became completely frozen; proper applications thawed and restored them to life; but inflammation and slight gangrene succeeded: the hernia, however, was reduced, and the man eventually did well.

It frequently happens in more northern climes, during severe winters, that the lobes of the ears and tips of the noses of those who are exposed to the weather will become frozen; they may be restored to life again by rubbing them with snow, the friction of restoring circulation, whilst the heat is moderated by the application.*

One of the best lotions that can be applied to an inflamed part, for producing cold, is composed of one ounce of rectified spirits of wine and five ounces of water. Goulard water is also much extolled for reducing inflammation and lessening pain; but when applied too long, or when containing a large quantity of lead, it has been known to destroy nervous irritability in too great a degree. Mr. Forster, of Guy's Hospital, saw a person in whom the upper eyelid became completely paralyzed from its improper application.

In applying the spirit of wine in solution, let the linen be fine, and

* Mortification of the toes, or of a considerable portion of one or both of the lower extremities, is not an uncommon consequence of exposure to severely cold weather, especially if the person be debilitated, and the action of the heart feeble.

In the winter of 1822, Andrew Tangilon, a Swede, was admitted into St. Thomas's Hospital, on account of mortification of both feet, from exposure to excessive cold, in the Baltic. He had been living for some time on salt provision, to which he was not accustomed. Separation of the mortified parts had commenced when he was brought to the Hospital, and he was in a state of extreme debility. By giving him nutrition and generous diet, his health rapidly improved, and I afterwards amputated both the legs below the knee, at an interval of twelve days. He perfectly recovered, and now works at Mr. Hanbury's refined sugar manufactory, on the Commercial Road.—T.

put lightly on the inflamed part, that evaporation may go on with facility; as it is by the abstraction of heat during evaporation that the good effects are produced.

Do not put ice to the inflamed part; it irritates and is apt to produce gangrene. Some years since, when I was making a series of physiological experiments, I wished to ascertain what effects would be produced on the pulse by the sudden application of severe cold, for which purpose I plunged my bare arm up to the shoulder into snow; immediately before the immersion the pulse was 80° , and it quickly rose, when immersed, to 109° ; this result was contrary to what I expected, and I repeated the experiment. The pulse sometimes did not rise so high, but was small and hard. The exposure to so great a degree of cold caused severe pain, and consequently was a source of irritation.

However, in deep-seated inflammation, as in that of the brain, and in determination of blood to the head, the application of ice to the scalp is of signal service.

Effects of the Cold Bath.—The experiment I have related led me to an examination of the principles of the action of cold bath; and I found, that when a person in health takes a cold bath, not being accustomed to it; it produces irritation, and sometimes renders the pulse irregular: but, on the contrary, when a person in a state of irritability and weakness, with a feeling of heat about him, goes into a cold bath, it tranquilizes the nervous system, and therefore is beneficial. It absorbs the superfluous heat, lessens nervous irritability, and reduces the pulse, when quickened, nearly to its natural standard.

I had injured my health by being too much in the dissecting-room, and I discharged a considerable quantity of blood from my stomach, and fever was the consequence. In this condition I went into the country for the benefit of a pure atmosphere; and I there had frequent opportunity of noticing the influence of cold on an irritable pulse, in my own person: before a fire my pulse would be at 120° ; but on going into the cold air, it sank in a short time to 100° ; and, by a longer continuance in the cold, it became still less frequent. When my pulse was quick and irritable, and my skin was heated, if I used a cold bath in the morning, on that day my pulse was slower, and the superfluous heat was removed; so that the body was much cooler than in the preceding day, or on the succeeding day, when the bath was not used. Thus, where there is great irritability of the nervous system, and where the heart is sending the blood with accelerated motion through the different channels, cold will prove invigorating, by lessening the first of these affections, and reducing the latter to the natural standard.

The manner, therefore, in which cold relieves inflammation, when locally applied, is by abstracting heat, by lessening the diameters of the vessels, and by diminishing nervous irritability.

Heat and Moisture.—The next mode of relieving inflammation by local remedies is by the application of heat, with moisture; this appears like contradiction; apparently, opposite causes are used to pro-

duce the same effect, and it seems to be blowing hot and cold with the same breath ; but it is not so. The application of heat alone would be injurious, by increasing action ; but, when combined with moisture, it is beneficial by producing relaxation, opening the cutaneous pores, and giving rise to perspiration ; thereby removing congestion, and producing nearly similar effects to those which arise from the application of blisters. The effects of heat and moisture combined are well exemplified by what happens when a person takes a warm bath ; for instance, a person, whose pulse is at 75°, places himself in a bath, the water of which is heated to 100° ; his pulse soon rises to 100° ; presently he perspires freely, his pulse becomes less frequent, but soft ; great relaxation follows, and, if he were not removed, he would faint, so great is the exhaustion that it occasions. Here then is a direct proof of what heat and moisture produce, when applied generally ; and when used locally, the effect on the part is precisely the same.

Fomentations are ordered on the same principle, to relax the secreting extremities of the vessels, and produce perspiration of the surrounding parts ; by which tension is removed, and the pain consequently abated. I do not think that medicated fomentations are preferable to mere warm water, unless the integuments be broken. With respect to poultices, they are used with the same views ; to excite relaxation, and to produce secretion ; the kind of poultice is of little consequence if the integument be sound.*

Local Bleeding by Leeches.—The next method of relieving inflammation is, by the application of leeches : by abstracting blood from the vessels of the part, they lessen their diameters, and consequently diminish their distention and force of action ; they take away but little blood during the time they remain on the part, but considerable quantities will flow from the wounds made by them ; if heat and moisture be applied immediately they fall off, as they prevent the formation of coagula, by which the wounds would otherwise become closed.

To some persons, and in some situations, however, the application of leeches is attended with very great inconvenience ;† as, for example, when the testis is inflamed, it is of considerable importance to some persons that bleeding from this part should be concealed ; in such a case, to avoid the inconvenience of the application of leeches, and the

* Even when the integument is sound, I believe anodyne fomentations or poultices to be of considerable service in alleviating local irritation ; and have known patients experience much benefit from their use, when common poultices have been applied without affording relief. If the iris can be affected by the application of belladonna to the eyebrow, or if preparations of lead are beneficial in inflammation when the surface is not broken, why may not anodynes allay irritation ? —T.

† In many persons, when leeches are applied, they cause a kind of erysipelatous inflammation, rarely of a dangerous nature, but producing considerable inconvenience and disfigurement. In such cases they afford little or no relief, and, therefore, should never be used.

If applied over parts which contain much loose cellular tissue, as the palpebræ, or the scrotum, an ecchymosis is a frequent consequence : this is a great objection to their being used to the exterior of the palpebræ in persons who are particular about their appearance. —T.

exposure consequent on the after bleeding, it is better to puncture some of the distended vessels on the scrotum with a lancet, keeping the patient in the erect position ; you may in this way get away any quantity of blood you wish ; and what is of great consequence you can stop the bleeding when you please, by placing the patient in a recumbent position, and applying some linen, dipped in cold water, over the punctures, which become quickly closed. In deep seated inflammation, blood should also be removed by cupping.

Treatment.—I shall now describe the local treatment of chronic inflammation.

In the acute inflammation, the object is to decrease vascular action ; but in the chronic we endeavour to strengthen and change it. Thus in long continued discharges, arising from relaxation, we endeavour to restore the vessels to their healthy power of contraction, by employing astringent and stimulating lotions,—as in chronic ophthalmia we apply solutions of alum, of the sulphates of zinc or copper, and of the nitrate of silver, &c. ; in chronic affections of the skin, we use lime water and calomel, or the oxymuriate of mercury, &c. Gonorrhœa, as I have already mentioned, is an excellent example of the difference between acute and chronic inflammation, and of the principles upon which the opposite treatment is founded ; at first you diminish action, but afterwards stimulate to promote contraction of the dilated vessels.

When you apply stimulating lotions, you should cover the parts with oil to prevent evaporation, by which cold would be produced, and your intention frustrated. The object being to excite heat and action, the prevention of evaporation materially assists ; and as the perspiration, as well as the vapour from the lotions, condense on the inner surface of the oil silk, it keeps the parts constantly moist, which is very advantageous, as it enables you to remove the applications without disturbing or injuring the new formed skin. When this covering is not used, the linen over the wound soon becomes dry, and adheres to the newly-formed granulations and skin ; consequently, when you remove this linen, the granulation and skin are much injured, and in this manner the progress which nature has made in restoration during twenty-four hours, may be defeated in a single minute.

Counter Irritation.—The next method of treatment is by counter irritation. The mode in which this acts, is by increasing a new inflammation near to the part diseased ; the surrounding vessels are immediately put in action to assist in the support of this new inflammation, and consequently blood is abstracted from the neighbouring part in which the disease previously existed : thus a blister at the nape of the neck, if early applied, will stop an inflammation in the brain ; a blister at the scrobiculus cordis will frequently check inflammation in the stomach ; an irritating lotion applied to the scrotum will often cure an inflammation of the testicle. It is curious to observe, that still a similar advantage is derived from counter irritation in parts that have no immediate connexion. In inflammation of the lungs, a blister applied on the chest (parts between which there is no direct communication) will assist in

checking the disease ; blisters on the forepart of the abdomen are very beneficial in inflammation of the liver, intestines, &c.

Blisters are more frequently used for exciting counter irritation than any other means. Issues and setons are sometimes adopted ; they were formerly much employed as counter irritants ; but they often produce too much, and also irritative fever, and thus add to the original malady they were intended to subdue. Counter irritants must never disturb the constitution. Sometimes after a blister has been removed, it may be necessary to keep up the irritation and discharge ; to accomplish this, the cuticle which has been raised by the blister must be removed, and the exposed surface dressed with the savine ointment.*

Another mode of producing counter irritation is by rubbing on the part tartarized antimony in combination with oil or lard. This is a very excellent method, and is now generally adopted. You must be careful, however, on what part you apply it, if you intend to excite irritation in a great degree, as it is likely to blemish the skin. I saw a young lady, who had used it on the arm for a chronic affection of the elbow joint ; she was much offended with her medical attendant, for recommending its employment, as it had left a scar on the part.†

Position.—The next circumstance to be attended to in the treatment of inflammation is position. Although the human body is not to be considered as an hydraulic machine, yet the fluids are in some measure governed by the laws of gravity. Look at the operation that I spoke of before, for relieving inflammation of the testicle ; the vessels of the scrotum are punctured, and if the patient be in an erect position, the blood will flow freely ; but put him in the recumbent posture, the stream will immediately cease.

If the hand or fore arm be the seat of inflammation, the limb should be placed on an inclined plane, by which the hand and elbow may be raised higher than the shoulder, as in thecal abscess of the fingers or hand, and in acute inflammation of the elbow joint, &c. It is equally necessary to attend to the position in inflammation of the leg. I will give you an example.—I was sent for to see a gentleman farmer, in the neighbourhood of Rayleigh, in Essex, who for a long time had been subject to a very severe inflammation in both his legs ; they were of a very dark red colour, much swollen, and gangrene was threatened in them ; the constitutional irritation was great, and his tongue covered with a brown fur : when I saw him, his legs were resting in a tub of cold water, and on his taking them out they smoked. I had him immediately placed on a sofa, and contrived to rest his legs upon one

* In some persons the employment of cantharides to produce counter irritation, occasions considerable irritation of the urinary organs, amounting, in some cases, to strangury : this more frequently happens, when the cantharides are applied with a view to promote discharge from a raw surface.—T.

† A mode of producing counter irritation, very common on the Continent, is by the application of moxa : one end of a roll of cotton (which has been dipped in a solution of nitrate of potash, and dried again) is lighted, the other end is placed to the part on which it is wished to produce irritation, and kept there until the whole is consumed. I have seen this operation performed several times, but I do not think it at all preferable to the other modes which are in common use.—T.

of its ends, so as to raise them much higher than his body ; the vessels soon began to unload themselves, and in a short time the redness of the skin was much lessened ; I then applied flannels, which had been dipped in tepid water, and afterwards in warm water ; this produced a free perspiration, by which the skin became unloaded ; the swelling and pain consequently diminished. He gradually recovered, and in six weeks was enabled to ride a considerable distance. It would be absurd to attempt to cure extensive inflammation in a limb, if it were allowed to remain in a depending posture.

Rest.—During the cure of inflammation, rest is absolutely necessary : all of you must have observed, that exercise increases the action of the heart and arteries, and would therefore be very injurious in inflammation. When a joint is inflamed, it is one of the grand principles in treatment, and no good can be done without it : it is curious to observe how nature herself endeavours to obtain this state ; for where a joint is diseased, the muscles of the limb have in a great degree lost their power ; thus, if a man has inflammation of the wrist, elbow, or shoulder joints, and you place your hand in his, desiring him to squeeze yours, you find that he cannot do so, or that the attempt is exceedingly feeble. In inflammation of the joints in the lower extremities, the muscles of the part in like manner lose their rigour.

Indurations.—Indurations frequently remain after inflammation has entirely ceased ; these are removed by the following means, which produce absorption.

Pressure.—Pressure has the power of exciting the action of the absorbents in an extraordinary degree, and you may apply it either by the use of rollers, or strips of plaster.*

Electricity.—Electricity too is attended by similar effects, strongly exciting the action of the absorbents.

Mercury.—Mercury does the same, and much more decidedly than the other remedies I have mentioned. Thus, when a man dies in our foul wards, in a state of salivation, we find that the alveolar processes, and gums, have in part been removed by absorption.†

Friction.—Friction has of late years been much employed for the

* When it is necessary to apply pressure to any part of an extremity, it is best to commence from the end, as the fingers or toes, otherwise partial pressure, by preventing a return of the blood by the veins, creates effusion and inflammation, and sometimes mortification.

A sergeant, belonging to an infantry regiment, was shot through the leg at the battle of Waterloo ; some considerable hemorrhage followed, to stop which one of his comrades tied a narrow bandage tight over the openings ; he remained several days in the neighbourhood of Waterloo, without having any medical assistance ; and although his leg had been excessively painful, and was swelled considerably, he was afraid to remove the bandage for fear of bleeding. When he was brought into the hospital at Brussels, gangrene had commenced, and he was obliged to submit to have the limb amputated.—T.

† In severe cases of iritis, in which lymph has been deposited on the surface of the iris, the influence of mercury, in promoting the action of the absorbents, is distinctly and beautifully shown. I have seen many cases in which the lymph occupied as much as one half of the anterior chamber ; yet, after mercurial action had been excited, and kept up for a few days, the lymph had entirely disappeared.—T.

cure of indurated and stiffened joints, consequent on inflammation ; it was recommended by the late Mr. Grovesnor, of Oxford. This remedy was his hobby, and, like all other hobbies, it occasionally carried its rider into the mire ; for Mr. Grovesnor sometimes recommended friction before inflammation had sufficiently subsided, consequently it produced mischief ; in many instances, however, when judiciously employed, the best results are effected. A gentleman, in the neighbourhood of Nottingham, when shooting, received a severe injury to his knee : after the violence of the first inflammatory symptoms was over, there remained considerable swelling, stiffness, and induration ; for these he was attended by Mr. Attenborough, an eminent surgeon, of Nottingham : as the gentleman did not rapidly improve, Mr. A. sent him to town, and he remained for a length of time here under my care ; still the joint continued in the same state ; I advised him to go to Oxford, and consult Mr. Grovesnor. This he did, and as soon as Mr. G. saw him, and found that his limb had been kept quiet, he told him to walk to the bottom of Christ Church meadow, and return to him, which the gentleman really did. Friction was used in this case with the greatest success ; for within six weeks from the time he went to Oxford, he called on me in town, quite recovered, to thank me for my recommendation to Mr. Grovesnor.

Friction accelerates circulation and absorption ; and the way in which Mr. Grovesnor recommended it to be done was by applying both hands to the joints, at the same time alternately moving them up and down.

Case.—The late Mr. Hey, of Leeds, a man whose mind was free from every paltry prejudice, most eminent in his profession, and ever anxious for its improvement, had a son who met with a serious injury on the ankle joint ; and after trying all he could to relieve him, without success, he sent him to Mr. Grovesnor ; and, under his care, by judicious application of friction, the actions of the joint were completely restored.

In cases of violence done to joints, when the inflammation has been subdued, which it will be in a month or six weeks, friction and motion are very useful : but in chronic diseases of joints, many months of rest will often be required before inflammation has sufficiently subsided to allow of friction and motion being safely used to prevent ankylosis.

LECTURE IV.

ON THE ADHESIVE INFLAMMATION.

For a knowledge of this process, we are indebted to that bright luminary of our profession, the late Mr. John Hunter.

Adhesive inflammation is the process by which divided parts become united.

Effects of Inflammation of the Blood.—Inflammation has a dispo-

sition to separate blood into its constituent parts: for when blood is drawn from a healthy person, it separates into serum and red particles only; but in a state of inflammation, if, after it has been drawn in a free stream, it be allowed to remain undisturbed, it separates into serum, red particles, and fibrin. The red particles, with some fibrin, will be collected together at the bottom of the vessel; and the greater part of the fibrin separated from the red particles, forms a yellow surface on the crassamentum, or what is called the buff of the blood, and the serum will occupy the surrounding space. The coagulation of the blood is slower than usual, and the red particles are precipitated, so that the fibrin, having lost the red particles, contracts with great firmness, and, when separated, it resembles a piece of leather. It has been said, that the adhesive matter is albumen; but it has been proved not to be so. Dr. Bostock, who lectured on chemistry several years at Guy's Hospital, took great pains to investigate its nature, and published on the subject. Mr. Dowler made many experiments for the same purpose, and found it to be decidedly fibrin. Mr. Hunter called it coagulated lymph: this certainly was not a very appropriate term. I shall call it adhesive matter from its effect in inflammation, and by which fibrin is to be understood.

On the Membranes.—Some of the exhalent surfaces of the body naturally secrete a watery fluid, and are called serous; while others, separate mucus. The cellular membrane is one of the former, and exhales a fluid somewhat resembling serum; it contains much less albumen. This membrane is prone to the adhesive inflammation. The vessels which usually secrete the fluid just mentioned, pour out fibrin under inflammation, and which, becoming coagulated, produces the hardness that we usually find in inflamed parts.

On the Peritoneum.—The membrane which doubly covers the intestines (the peritoneum) is a serous surface, often affected by the adhesive inflammation, which occasions the two surfaces of this membrane to be firmly glued together.

On the Pleura.—But the part of all others which is the more subject to this kind of inflammation is the pleura; and we rarely open a body of the adult without finding on the surfaces of this membrane some unnatural adhesions.

On the Pericardium and Dura Mater.—The heart, in like manner, is often glued to the pericardium, so that its cavity is sometimes obliterated. And in the membranes of the brain we frequently meet with partial adhesions between the dura mater and tunica arachnoides.

Thus, then, it will be seen that the serous membranes readily assume the adhesive inflammation, by which they become permanently united to each other, or to the adjacent parts; this is a most beautiful and wise provision of nature; for if the membranes of cavities, such as the pleura and peritoneum, instead of the adhesive were to produce the suppurative inflammation, effusion and death would be the frequent consequences; for example, matter would be often formed in the cavity of the pleura, and empyema would generally destroy.

On the Urethra.—The urethra is generally affected by the suppurative inflammation. This is another of nature's benevolent and wise ordinances ; had the outlets of our bodies been subject to the ready production of adhesion, they would have become closed and life destroyed. Sometimes, where inflammation of the mucous membrane of the urethra is exceedingly violent, it passes into the adhesive stage, glues the parts together, produces retention of urine, and unless the person were relieved by an operation, the disease would end in the destruction of life. I witnessed the following curious example of this circumstance : a kangaroo was brought to me for dissection, from Exeter Change ; its bed of straw had caught fire, and, although it was very soon extinguished, the animal died ; and the proprietor, knowing that it had not been severely burnt, was at a loss to account for its death. Upon examination, the bladder was excessively distended with urine, and it was retained in consequence of the closure of the urethra by the adhesive inflammation ; the penis having been injured by the fire, the inflammation that followed was violent, and, being adhesive, closed the urethra. Thus you may perceive that common gonorrhœa would destroy life if the urethra were not so constructed that its membrane is more readily affected by the suppurative than by the adhesive inflammation.

Trachea.—When inflammation attacks the air tube, it usually happens that the mucus, which it secretes, becomes purulent ; but in very violent inflammation adhesive matter is effused, and produces the disease which is called croup. If the larynx be the seat of this disease, it frequently destroys life ; but when the inflammation is seated in one of the bronchiæ, the adhesive matter is coughed up, in an aborescent form, and the patient recovers.

Nature of Adhesive Matter.—When an incision is made into a part which has been affected by the adhesive inflammation, viz., the cellular membrane, a quantity of serum is found effused around the inflamed part ; and in the part itself, a yellow and semi-transparent substance, having the appearance of jelly, though different in its nature. The best opportunity of witnessing the adhesive inflammation is on the skin, under the irritation of a blister ; the blister produces the same effects as those occasioned by the operation for hydrocele. Let a blister be applied for twenty-four hours, till the cuticle be raised ; then make an incision into the vesicle, and a quantity of serum will escape : here, your observation generally terminates ; but examine the surface, and you will find on it a yellow substance, which will in a greater or less degree exist, according to the length of time the blister has been applied ; also on its severity, and the irritability of the skin, but, generally under the application of a blister, adhesive matter is effused, as under adhesive inflammation.

Time required for Production of Adhesion.—To those who are anxious to know the time required before the commencement of adhesive inflammation, it may be proper to state, that it is different according to the structure of the part and nature of the constitution. In the

cavity of the abdomen, the intestines will be glued together in nineteen hours after the adhesive inflammation has begun. I mention nineteen hours, because I have seen it produced in that time in a case of gun-shot wound. It may be in the recollection of some of you, that a Mr. Blight was shot by a man of the name of Patch, in the neighbourhood of Deptford ; the ball traversed the abdomen : I was called to this case, and Mr. Blight died nineteen hours after he had received the shot. I had an opportunity of seeing what I have just mentioned ; the intestines were glued to each other, and to the peritoneum ; the surface of which had much adhesive matter on it.

On other wounds the process of adhesion takes place rapidly ; for if a piece of lint be applied to a recent wound, in twelve hours it will be glued firmly to the surface : in a dog the adhesive process commences in six hours.

Adhesive matter, when effused in a thin membrane, coagulates in a net work, assuming the character of cellular membrane.

Adhesive Matter becomes organized.—When adhesive matter has been formed, blood-vessels soon enter it, and within a short time it becomes organized ; the vasa vasorum are elongated, by the force of circulation, and enter the newly formed substance, sending out minute ramifications. On cutting into adhesive matter within twenty-four hours after it has been deposited, small bloody spots may be seen, marking the future situation of the vessels which nourish it ; but it is not till ten days after it has been formed that any considerable portion of adhesive matter becomes entirely organized : for if injected, you will not completely succeed through every part of the newly formed substance until ten days after the injury, and not even so soon in certain structures.*

When vessels elongate, they have not the character of arteries in general ; they take a serpentine and tortuous course.

It has been thought that the new vessels originated in the effused substance ; but they are formed by the elongation of the vasa vasorum of the surrounding arteries, which become dilated, lengthened, and serpentine, and the degree of vascularity will be in proportion to that of the part subjected to the adhesive process. In tendons, for instance, it will be much less than in muscles.

Use of the Adhesive Inflammation.—This process is of the greatest possible importance in surgery. It ought, therefore to command much of your attention ; and it will be unfortunate for you if

* Mr. Hunter relates a case in which the adhesive matter, effused in inflammation, had become organized in twenty-nine hours. He operated on a man for strangulated hernia, and the patient died twenty-nine hours after the operation. On examination of the body, he found some adhesive matter (which did not exist at the time the operation was performed) deposited on the portion of intestine which had been strangulated ; very fine injection of different colours was thrown into the arteries and veins of the gut, which also filled the new-formed vessels in the adhesive matter, rendering them perfectly distinct.—T.

you do not understand it. Without this process no operation could be attended with success : its absence, even after bleeding, would destroy life. Bear this principle in mind, endeavour to effect union by adhesion. You have seen, during this present winter, a man admitted into Guy's Hospital with a compound fracture, which was rendered simple by applying lint dipped in blood, and in a fortnight all danger from the accident was dissipated.

In Compound Fracture.—Suppose you were called to a compound fracture, what would you do? Endeavour, certainly, by bringing the parts together, to make it simple fracture. Within these few days you have had an opportunity of witnessing the fatal consequences of hæmorrhage in a case of compound fracture; but if the adhesive process had taken place, hæmorrhage would have been prevented, constitutional irritation lessened, and recovery rendered almost sure.

In Operations.—It is the same in formidable operations. The Cæsarean section, which consists in making an incision in the course of the linea alba, for the purpose of extracting a fœtus from the womb is not dangerous, if the adhesive process takes place. Its advantages may be exemplified by the operation for cataract: in this operation a wound is made in the eye, more than half of the cornea is cut, the adhesive process begins within twelve hours, and in twenty-four the edges of the wound are consolidated. Suppose, on the contrary, they do not adhere, violent inflammation supervenes, and the result is destruction to the eye of the patient by suppuration: the success of the operation depends then on the adhesive process. In a person who has been in ill health, the inflammation may be too weak, and in another case it might be too strong; suppuration would be the consequence in both instances: thus the same effect results, though produced by very different causes. Again, in the operation for strangulated hernia, an opening is made into the hernial sac, which communicates with the cavity of the abdomen; and if the parts are not afterwards united by the adhesive process, the patient dies.

In the operation for aneurism, it is the adhesive inflammation which saves life; a ligature is applied to the artery, a coagulum of blood forms, the adhesive process commences, fibrin is poured out, and the internal coats of the artery are glued together: but for this circumstance, when the ligature separates, hæmorrhage will certainly ensue.

In the operation for the radical cure of hydrocele, we have an excellent opportunity of witnessing the effects of adhesive inflammation. After the water has been evacuated, a stimulating injection being thrown into the cavity, excites upon its sides an irritation; inflammation is set up, adhesive matter is thrown out, the internal surface of the cavity generally becomes permanently united, and thus a radical cure is effected. If an incision be required to be made into the tunica vaginalis, whilst it is suffering from the adhesive inflammation, its cavity is found filled with a substance which has the appearance of jelly.

The treatment of a stump after amputation will best exemplify this subject. In amputating a limb, your first object is to preserve sufficient integuments to cover the ends of the bone; it should be integument and not muscles, which cover the end of the bone; for if muscles are brought with the integument over the bone, they will contract, and retraction of the skin covering the stump will be the result. When the limb has been removed, you will apply ligatures to the bleeding vessels; now I would not advise you to tie every small vessel; ligatures on the principal vessels are quite sufficient, and the fewer you apply the better; for though it is very desirable to prevent disturbance of the limb on account of hæmorrhage, yet by waiting a short time after the operation, the bleeding from the smaller arteries will generally stop.*

The ligatures themselves should be small, and consist of fine silk; for nothing is worse in operations than the application of coarse ligatures, excepting perhaps in cases of ossification of the arteries, when it would be justifiable; with this exception only, it is the worst possible surgery to apply thick ligatures to arteries.

Now there are two reasons why small ligatures are preferable: 1st, because they are less liable to escape from the artery; 2d, they divide the internal coats of the arteries more effectually: when you use a very fine ligature, the internal coats will be divided, and the external will remain entire. My friend Dr. Jones published an excellent work on the means by which arteries unite in cases in which they have been divided, or ligatures applied upon them; and he first stated the fact of the internal coats of the artery being divided by the application of fine ligatures; and that they consequently would more readily adhere from their surfaces having been broken. Thick ligatures prevent the wounds from healing so rapidly as thin, and they are upon that account objectionable. After the vessels have been secured, the sponge should be applied, and all coagula of blood be removed, as this is very essential to the union of the part; blood is not the means but the prevention of union in such cases; for unless it be removed, the

* During an operation, especially in winter, the patient becomes chilled, or if a considerable quantity of blood has been lost, he becomes faint. In either case the blood will not flow from vessels, which may afford a very free hæmorrhage, when the patient gets warm in bed, or reaction takes place. Independent of the mischief which must result from opening an extensive wound to take up these vessels, at a time that the adhesive process is probably going on, the patient's life is often endangered by the after bleeding.

The plan I usually adopt is as follows: after the larger vessels have been secured by ligatures, I bring the edges of the wound together by one or two strips of plaster, and then have the patient put to bed; and when the pulse indicates that the heart and arteries are again acting with their proper vigour, if there be any fresh hæmorrhage, the vessels are secured; the part is cleansed from coagula, and the dressing is completed.

This practice is, I believe, generally pursued in the army, and also by many hospital surgeons; and is particularly applicable in the after treatment of those persons who have undergone operations for the removal of diseased mammæ, or for the excision of a testicle; in the latter case, there is most frequently a secondary hæmorrhage, if the wound is closed immediately after the operation.—T.

adhesive inflammation will not produce its desired effect. There is one instance in which blood favours the process of adhesion, and that is in the application of a ligature on a blood vessel ; for a clot of blood forms in the artery, and is afterwards glued to its interior by the adhesive inflammation : with this exception, the opinion of blood producing the process of adhesion, is to be banished from your minds, for there are two modes by which union is effected ; viz., by adhesion and by granulation ; therefore, remove all clots of blood, which will only act as extraneous bodies, and keep up irritation. You are to cut off one end of the ligature close to the vessel, and let the other hang from the wound : it has been recommended to remove both ends of the ligature close to the vessel ; this plan has, however, been already abandoned. It was, I have understood, determined by John Hunter, in the first operation he performed for aneurism on the trunk of the artery above the tumour ; for in that instance he cut the ligature close to the knots, and copious suppuration occurred when it separated. Ligatures can only be removed from vessels by suppuration or absorption (in the latter case they must be first dissolved, and then removed by the absorbents); and conceiving that if a ligature, composed of a substance easily soluble, were applied to a vessel, and cut close to the knot, it might be dissolved and then absorbed, I applied a catgut ligature to the femoral artery of an old man upon whom I operated for popliteal aneurism, and cut it close to the vessel ; this case succeeded, for adhesion followed, and suppuration did not ensue.

Although successful here, I have tried it in several cases since, and have not been able in any to prevent suppuration. I applied a silk ligature to the carotid of a dog on one side, and a catgut to the carotid of the opposite side. Upon killing the dog some days afterwards, I found the second ligature (catgut) buried in a cyst, and that the first had ulcerated the artery, and advanced to the side of the larynx by a process of ulceration. Experiment and observation show that it is the best plan to cut one end of the ligature off, and to leave the other hanging from the wound, to be removed when the ulcerative progress is completed, which is from ten to fourteen days. Dr. Veitch, I believe, first advised the removal of half the ligature.

After amputation, having disposed your ligatures in a line with each other, and leaving them to hang out at the most depending part of the wound, you will, if the limb be removed above the elbow or knee, apply a roller to prevent retraction and separation of the muscles and extensive suppuration. I have seldom succeeded, to my satisfaction, with my stumps above the knee without a roller ; it is better to apply a roller in such cases, for the muscles will then be glued together, and form one consolidated mass. Having applied a roller, and brought the integuments together, I merely put three strips of adhesive plaster over the wound, and two round the stump, to keep the ends of the plaster in their place. It is curious to see the difference between the mode of dressing stumps now, and that adopted a few years ago. The old practice was, after the adhesive plaster had been applied, to put

some lint, then plaster again, after that tow, and lastly, over the whole, a cap of flannel. If a surgeon were to do this now, he would be laughed out of the operating theatre ; and very deservedly, because he would prevent the success of the adhesive process by undue heat in the limb.

All that it is necessary to do is, to use three strips of plaster over the wound, and one circular piece ; if the weather be hot, to apply spirit of wine and water ; and if cool, to keep the limb quiet. The object is, to prevent the inflammation passing beyond the adhesive stage ; for then suppuration must be the result.

The last circumstance necessary to mention is, the impropriety of dressing the stump too early ; a surgeon, anxious to see if union has been produced, removes the plasters from the wound in two or three days ; he who does this, entirely overlooks the object in view, and must be shocked, when he observes that the early removal of the plaster has destroyed all that nature had done. You ought, in four days after the operation, to remove one strip of plaster, for the purpose of letting out any matter which might have collected. In six or eight days after the operation, it will be proper to dress the stump, and then to re-apply a strip of plaster before you remove the whole of the first dressing.

This treatment, which is applicable to stumps, is proper also for common wounds ; so that these are the principles by which you are to be directed.

The adhesive process is useful in the formation of cysts. Balls encysted, have been known to remain in the body for many years. Morgagni, if I rightly recollect, mentions a case, in which he found a ball lodged in the cyst in the lungs. You see by this preparation, how complete is the cyst, and being little irritable, the ball remains in a quiescent state for the rest of life. If the ball be not encysted, it travels, by absorption of the parts through which it passes.

Another very important use of adhesive inflammation is, that of its dividing cavities into distinct parts, by which means it fixes a boundary to the suppurative process ; thus the cavity of the abdomen becomes divided into two, by the effusion of adhesive matter on the surface of the colon, by which it is glued to the peritoneum. In abscesses a cyst is formed by the adhesive process round the matter, and prevents its escape into the surrounding cellular tissue.

The advantage of adhesive inflammation is admirably shown in wounds in the joints. So soon as the knee joint is opened the synovia escapes, the person feels faint, looks pale, and the constitution appears to have received a severe shock. The wound endangers the loss of the limb and of the life of the patient, as the surgeon treats it judiciously or erroneously. If a poultice be applied to such a wound, or fomentations be used, a suppurative inflammation will follow on the synovial surface ; the cartilages become absorbed, and the bones ulcerated ; a profuse discharge ensues ; the constitution becomes extremely irritated ; chills, succeeded by burning heat, and profuse perspiration,

frequently follow each other; and a person, just previously in the finest health, is precipitated into a state of extreme emaciation. Sometimes the joint, after weeks or even months have elapsed, gradually heals by granulation, with entire loss of motion, or a great diminution of it.

If, on the contrary, the surgeon brings the edges of the wound immediately together, and takes advantage of the adhesive inflammation to close the wound, the patient escapes from local or constitutional irritation, and in a fortnight is free from danger, and has scarcely suffered from the injury. He effects this object, by bringing the edges of the wound together, by a fine suture, a plan to which some surgeons object; but when the wound is direct into the joint, it secures best the safety of the patient, as the secretion of synovia has a constant tendency to prevent adhesion, and to separate the plaster. Let the suture penetrate the skin only, avoiding the ligament; apply a piece of lint over it wetted in the patient's blood, and strips of adhesive plaster over the lint. A roller is to be gently bound round the knee, and to be kept constantly wet with the liq. plumb. acet. \overline{c} spir. vini; and a splint is to be placed behind the joint to preserve perfect rest.

In cases in which the constitution is destitute of vigour, the adhesive inflammation is sometimes so deficient, that immense abscesses are formed from their not being bounded by adhesion; and I recollect having seen in a poor hypochondriac the back nearly covered by an abscess to which adhesion had not formed bounds.

In hare-lip it is by the adhesive inflammation the wound becomes united, and the horrible deformity is removed.

The effusion of adhesive matter, by unloading the vessels of the part, has the effect of reducing the inflammation; so that the process generally terminates as soon as this effect is produced.

The great facility with which many of the soft parts unite by adhesion, has led to the application of this principle for the reparation or restoration of some portions which have been destroyed by disease, or designedly mutilated.

In the East Indies, where it is the practice of many of the chiefs to cut off the noses of their prisoners, an operation is frequently, and in most cases, successfully performed, to make a new nose. Mr. Carpue has performed some successful operations of the same nature in this country, and the mode of conducting them has been well described by him.

Mr. Lynn has made a new under lip, by bringing the skin from beneath the chin.

I have made a new portion of urethra from the skin of the scrotum, and Mr. Earle has performed a similar operation with success.

Occasionally some small portions of the soft parts, which had been completely separated from the body, have again united: many curious cases are on record; but I shall speak more at length on this subject in the Lecture on Wounds.

LECTURE V.

ON SUPPURATION.

Definition.—SUPPURATION is the formation of purulent matter from the orifices of the blood vessels; and the fluid so produced is called pus.

Purulent matter is formed either from the exhalent vessels of natural surfaces, when inflamed, or in cavities formed in the body, by an ulcerative or absorbent process as in abscesses, or from granulating surfaces.

Constitutional Symptoms of Suppuration.—Rigors, succeeded by heat, attended with a quick and hard pulse, and with other symptoms of constitutional irritation, generally precede the formation of matter in acute abscesses.

When matter is formed upon the natural surfaces of the body, which are connected with organs of vital importance, much irritation, and disturbance, attend it; but when matter is produced upon wounded surfaces not important to life, or upon parts of little vital importance, then it is often formed without an irritative fever preceding it.

Whilst the rigor occurs, the blood is collected in the large vessels in the vicinity of the heart, and in the heart itself. Torpor of the nervous system, coldness of the surface, and diminution of the powers of volition occur, and irregular actions of the muscles are produced. But the congestion of blood in the heart soon excites it to additional action, and the blood is propelled from it through the vessels with unnatural force. The heat of the body is then restored, and nature directs the blood to the part in which it is particularly required; and thus does the constitution assist in the production of suppuration. These excessive exertions lead to relaxation and debility, and the vessels pour out from their extremities upon the surface of the body, the watery parts of the blood in the form of perspiration; but when pus is easily produced, as upon some mucous surfaces, and upon the surfaces of wounds, such constitutional effects are often unobserved.

Local Symptoms of Suppuration.—The local symptoms which attend this process are, that the part becomes more painful; that the kind of pain is changed from an equal and dull sensation, to an acute and pulsatory pain, accompanied by throbbing of the vessels, so that the patient can reckon his pulse in the inflamed part. The swelling rises at one part, so as to form a portion of a smaller circle, or to be, in the surgical expression, pointed; the redness is increased, becoming more of the arterial kind, so that there is a blush upon the surface. A fluctuation may be perceived by feeling the part with two fingers at a slight distance from each other. The cuticle separates, a vesication destroying its attachment, and the cutis and cellular membrane become thin, so that the matter gradually approaches the skin.

Sometimes the external surface of the skin ulcerates in a number of spots to meet the ulceration from the interior, but generally the process is entirely from within. At length an opening of an irregular kind is produced, and the matter gradually escapes, as the aperture enlarges.

Time required for the Formation of Pus.—The time required for the completion of this process depends upon the constitution of the patient, and the nature of the parts, in which, or under which, the matter is formed. If seated under a tendinous structure, abscesses are very slow in proceeding to the skin, on account of the difficulty which attends the ulcerative process in tendons. In a healthy constitution, from seven to fourteen days will be required to form and to break an abscess in the breast of a female, who is otherwise healthy, although it is sometimes a much longer time.

Parts prone to Suppuration.—Some parts of the body are very prone to the suppurative inflammation, so that in them suppuration seems to precede the adhesive process; a slight degree of inflammation, producing suppuration, or a higher degree of it, adhesion. Mr. Hunter first observed this circumstance.

The Urethra.—The urethra, when it has irritation produced in it from the introduction of a bougie, frequently suppurates, but very rarely adheres.

Trachea.—The trachea, if it inflames, generally suppurates, although the adhesive inflammation does sometimes occur in it.

Nasal Membrane and Lachrymal Canal.—The lining membrane of the nose, if it inflames, easily suppurates, the mucus becomes first of a yellow colour, and then pus is secreted. The lachrymal sac and duct very generally suppurate, under inflammation; and hence the disease is called fistula lachrymalis, from the suppuration proceeding to ulceration, and the matter being discharged through the fore part of the cheek.

The Antrum.—The antrum maxillare and the frontal sinuses also readily suppurate under inflammation.

Joints.—When joints inflame, the internal surface of the ligament which secretes the synovia is more disposed to the suppurative than to the adhesive inflammation, on account of its mucous structure; and there is considerable difficulty in preventing suppuration in these cavities, when they have been opened by wounds. The skin, the cellular tissue, and the external part of the ligament will adhere; but the synovial surface, which secretes a mucilaginous fluid, does so with difficulty. The surgeon is therefore obliged to depend upon the production of adhesion in the external parts. The same observations apply to wounds of the cæ, which are very apt to suppurate, and the matter to take the course of the tendon to the wrist, and to produce by its confinement the most violent symptoms of irritation.

In making openings into joints to remove extraneous bodies, it is desirable to draw the skin aside before the aperture is made; and, when made, it should be suffered to return to its natural situation, and it

forms a valve to cover the opening : in this way I first saw Mr. Cline perform the operation, and in the same manner I have since done it myself.

The vessels of mucous surfaces being large, allow of the passage of the globules of pus more readily than such globules could pass through the vessels of serous surfaces, which naturally secrete the more watery parts of the blood. It does not in the least diminish our admiration of the law, that the interior parts of the body shall adhere and the outlets suppurate, because we know that it is founded upon a difference in their structure.

The evil which arises from a suppurative process, upon surfaces naturally serous, may be shown in the following examples, in which the suppuration arose on serous surfaces from an unhealthy state of the constitution.

Cases.—I amputated the leg of a man, in Guy's, for a very unhealthy ulcer. In a few days after the operation he became delirious, had much pain in bending his limbs, and had a low fever, which might have been mistaken for typhus, although it was only a fever from irritation : in the second week from the amputation he died. Upon examination of his stump, I found matter had formed above the ligature, both in the artery and vein ; it had not mixed with the blood, but its formation and confinement produced the violent symptoms of irritation which followed. The vessels were also inflamed above the part in which suppuration had happened, which was probably the cause of fever ; the occurrence is but rare, and was probably the result of a very irritable constitution. Also, in a case in which I tied the saphena major vein, matter formed in it, and the most violent constitutional irritation was produced, with delirium ; and although the patient did not die from this cause, she was in the most imminent danger.

The formation of matter in the pleura, pericardium, and peritoneum, succeeding the adhesive inflammation, shows the wise provision of that law which renders them prone to the adhesive process.

Formation of Pus.—Pus is not, as it was formerly supposed to be, a fluid formed by the dissolution of solids, but is produced directly from the blood, changed somewhat in its nature from the action of the blood-vessels. That it is not the product of the solids of the part upon which it is produced, is seen in the application of a blister to a surface. For instance, let a blister be applied upon the chest, and the cuticle raised, the serum which is produced, and the fibrin which is poured out, be removed in a few hours : inflammation arises upon that surface, and pus is formed on it from the extremities of the exposed vessels. Some little change may take place after the effusion, but the fluid is directly formed from the open extremities of the vessels. On all serous surfaces, as the pleura, pericardium, and peritoneum, there is no loss of substance in the largest productions of matter ; but, on the contrary, great addition is made to these membranes. Is the urethra abraded in gonorrhœa, or the trachea in its suppuration ?

Pus seems to possess no chemical quality by which it can act upon

dead, much less can we conceive its power of dissolving living solids. Bones will remain for months and even years in pus without solution, and tendons continue in it for several weeks, and at last separate by sloughing. Experiments were made in this Hospital, whilst I was apprentice here, to ascertain if portions of meat would be dissolved in pus; but no diminution of their weight was found until the process of putrefaction commenced; it follows then, as milk, bile, saliva, or tears, are produced from the blood by the action of the blood-vessels, so is pus but an altered state of the blood, produced by the extremities of the secreting vessels upon the natural surface, or upon the granulations of an ulcer.

Inflammation precedes the formation of matter: in healthy persons it is active; in the debilitated and scrofulous it is often very slight, and the pus which is produced is generally less perfect. Sometimes even there is such a change of action that the products entirely differ, being serous and curd-like, or even chalky, in scrofulous abscesses.

A cyst is formed in an abscess to surround and confine the matter; but it is to be understood, that this cyst is not a cell in which the matter is contained, but the cellular tissue has in its interstices adhesive matter effused, which prevents the pus from passing into its cells in a healthy abscess.

Nature of Pus.—Pus is a yellow fluid: if poured into water it sinks in it, and is consequently of greater specific gravity than water; on the other hand, mucus generally swims in water. It appears to contain the constituent parts of the blood: examined under the microscope, it possesses globules, which differ from those of the blood in colour, but greatly resemble them in their general appearance. These globules float in a fluid which resembles serum in its coagulating by heat, as is easily seen by exposing pus in a spoon over the flame of a candle. Pus also contains abundance of fibrin: if water be poured upon pus until the solid part which remains at the bottom of the vessel be entirely deprived of its serum and globules, numerous portions of fibrin are found remaining; although not exactly the same size, yet they have a great uniformity of appearance. This pus is composed of serum, fibrin, and globules; and if I were to hazard a theory upon this subject, I should say that pus was composed of the constituent parts of the blood slightly changed in their character by inflammation.

It does not appear to be prone to a putrefactive state; and we therefore find, in its healthy state, it has not a putrefactive smell; but changes in the constitution will sometimes render it excessively putrid.

Case.—A butcher's servant fell from a window upon one of the hooks of the shambles, which caught him, and suspended him by the ham until he was extricated: he was brought into St. Thomas's Hospital, in which he died of tetanus ten days after the accident. An abscess appeared in his ham two days before his death; and when it was opened, the matter was found insufferably offensive.

Matter will be also rendered offensive by local circumstances, as by diseased bone. For example, in diseases of the bones of the nose, the

smell is more offensive to my olfactory nerves than any thing I know in nature.

Nature of Fætid Pus.—Matter thus changed or altered, by the presence of blood or of sloughs, was found by Dr. Crawford (formerly physician of this Hospital, whom I recollect making many experiments upon the subject) to contain sulphuretted hydrogen gas.

Secretion of Pus suspended or changed.—A state of fever, or an inflammatory excitement in the part, will suspend the secretion of matter. We see, in fevers, irritable sores becoming dry, and often almost appear to heal, whilst that state of constitution continues; but becoming again irritable and secreting largely when the fever subsides.

When inflammation occurs upon a leg which has been long the subject of ulcer, the sore ceases to secrete whilst the surrounding skin is red, but matter is reproduced so soon as the inflammation ceases. The character also of the matter becomes changed by local inflammation. Thus we see serum substituted for pus, or a red fluid, composed of serum and red particles, produced whilst inflammation exists in the vicinity of a sore.

The fluid last described often irritates the surrounding skin and produces excoriation; but pus, when formed in its usual manner, is incapable of producing irritation on the surrounding parts, so that we see the skin for days, and even weeks, covered with the matter produced in compound fracture, yet it remains healthy; but let there be fever, or the irritation of an exfoliating bone be present, and the skin soon becomes inflamed from the different quality of the fluid produced.

That pus is formed by the action of vessels is well evinced by the changes which it undergoes in specific inflammations; for then not only is pus produced, but matter possessing poisonous qualities. The matter of gonorrhœa is applied to the urethra, and a poisonous pus is secreted; and it will proceed for weeks, or even months, and be still capable of conveying a similar infection. Our sailors have thus been the means of conveying gonorrhœa to Otaheite, and to many others of the South Sea islands. The matter of chancre produces a sore capable of affecting the glands on the groin, the skin, the periosteum, and the bones.

The fluid of small pox will occasion, by its insertion in the skin, poisonous matter, capable of exciting fever and covering the body with pustules, all containing similar matter to that which originally produced the inflammation at the inoculated parts: a poison not extinguished by death; for a friend of mine inoculated his daughter from a pustule of a subject dead from small pox, and she had the disease not in a severe form.*

Utility of Suppuration.—It is obvious, that a process like that of suppuration, and which is so frequent an effect of inflammation, must be instituted for beneficial purposes; and the uses which it serves are as

* In the Lecture on Poisons, a very curious case will be given of a new disease, produced by the translation of a poison from the horse to man.

follow :—Upon the surface of wounds, the principal advantage derived from its presence, is, that it keeps the granulations moist, and thus enables the vessels to elongate, and to form additions to the granulations, until the cavity is filled by them ; without the production of this fluid, the surface of wounds could never heal, because the granulations would be destroyed.

In expelling Extraneous Bodies.—The second use of matter is seen in abscesses, in which it is the means of exciting absorption, and thus of producing an opening, by which the cause of irritation may be removed ; and it afterwards covers the rising granulations until they reach the surface of the skin.

The coagulable matter, which the pus contains, will lead to the healing of a sore without any adventitious aid. Thus we see, in other animals, sores encrusted with the solid matter of pus left by evaporation : under this is fluid pus contained ; and when the incrustation is removed, healthy granulations appear. In sores obstinately resisting different applications, I have seen them thus encrusted when left without applications of any kind, and heal gradually without further attention.

Caution in stopping long-continued Suppuration.—When sores have long existed, some caution is necessary in healing them : nature appears to produce a quantity of blood equal to the discharge which they have supported, and to continue to do so after it has ceased. Inflammation of the lungs and apoplectic seizures will sometimes follow their sudden cicatrization. This may be prevented by great attention to the secretions, by giving frequently calomel at night, and an aperient in the morning ; or by occasionally taking away blood, when the above symptoms intervene. The surgeons of former times made issues, or setons, with the same view ; but they are now very much discontinued, because, by such attention as I have advised, their use is superseded. But still it cannot be denied, that a sore will sometimes relieve symptoms of diseased lungs, and even of determination to the brain, independent of any direct counter irritation upon the affected part.

Case.—Mr. Wilson, formerly lecturer on anatomy in Windmill Street, informed me, when he was a young man, that he had hæmoptoe and other symptoms of pulmonary disease ; that an ulcer formed upon his arm, by which the symptoms were relieved ; that he was anxious to heal the sore, and the symptoms returned upon its cicatrization ; that the discharge was reproduced, and the pulmonary symptoms were again relieved.

The suppression of discharges from the ear is attended with great danger of producing matter on the brain.

Cases.—Dr. Meyer and myself attended, in Austin Friars, a gentleman who died with hemiplegia, and apoplectic symptoms, from the sudden suppression of matter in the ear. I opened this gentleman, and found matter on the cerebellum opposite the labyrinth of the ear.

Dr. Babington and myself attended a gentleman in Cheapside, in whom I also found matter upon the surface of the brain, from an arrest of secretion of matter from his ear. We also attended together, in St.

Paul's Churchyard, a similar case, in which matter was found between the dura mater and surface of the brain.

Dr. Cholmely examined a woman in Guy's Hospital, who died from a similar disease. I can call to mind eight cases of inflammation of the brain, produced by suppression of suppuration in the ear.*

With respect to the treatment of suppuration, it consists principally in the application of fomentations and poultices ; but we shall treat of this subject more particularly when we describe abscesses.

LECTURE VI.

ON ULCERATION.

Definition.—ULCERATION is the absorption of any constituent part of the body.

Effects of Inflammation on the Blood-vessels.—We have already endeavoured to explain to you, that under the action of the vessels which accompanies inflammation, an increased deposit follows from the arteries ; also that this deposition depends on the stage of the inflammation, and the texture of the part in which it is seated ; thus the inflammation is either adhesive or suppurative ; and it ends in the one state in the immediate production of adhesion, and in the other in the effusion of a quantity of purulent matter from the extremities of the vessels.

Effects on the Absorbents.—But the influence of inflammation is not confined to the arteries ; it has also an effect on the absorbent vessels, which are thrown into a state of inordinate action, whenever any considerable quantity of blood is determined upon them.

There is a natural balance between the action of the arteries, and of the absorbent vessels, in a state of health ; and at the adult period of life, the portion of matter deposited by the arteries, and that taken into the system by the absorbent vessels, are as nearly as possible balanced. In infancy a greater quantity is poured out by the arteries than the absorbents remove ; but in age, a smaller quantity is deposited than absorption is taking away : thus the balance is destroyed in a different manner, at different periods of life ; but when a considerable and un-

* It is curious for how long a period these chronic suppurations will continue. The following is an extract of a letter which I received from a village in Carmarthen-shire. An attack of scarlet fever, at ten years of age, "left me extremely deaf in my left ear, and with a discharge of matter from it, which has continued ever since ; I am now thirty-seven years of age. In the course of the time that has elapsed, I recollect the discharge having been more than usual about four or six times, which continued about a day, and was always attended with a dead aching pain in my head," &c., &c.

natural absorption takes place of some part of the body, that absorption is denominated ulceration.

It was formerly thought, that it was necessary to the ulcerative process that matter should be formed ; but this opinion is not true, for ulceration often occurs without its being accompanied by any purulent secretion. The formation of matter, therefore, is not necessary to the process of ulceration.

Causes of Ulceration.—The great cause of ulceration is inflammation united with pressure. If the inflammation be considerable, and the pressure but slight, ulceration will be produced ; and if the pressure be very considerable, and the inflammation but slight, still there will be ulceration.

Pressure.—As a proof, both that pressure is the cause of ulceration, and that ulceration is not necessarily accompanied with the formation of matter, I will give you an example in aneurism. Here is a specimen on the table of a large aneurism of the aorta just above the heart, in which you may pass your hand into the opening produced by the ulceration of part of the ribs and sternum ; those parts having been absorbed by the pressure of the aneurismal sac producing an increased action of the absorbent vessels. Here the pressure is exceedingly great ; but the degree of inflammation is very slight. In the same manner we see an aneurism of the aorta in the fore part of the spine, producing absorption of the vertebræ by the pressure of the aneurismal bag, though no matter is effused ; the ulceration being produced by pressure, accompanied with slight inflammation, but not by any secretion of matter.

From these facts we are led to conclude, that the formation of pus is not necessary to the ulcerative process, but that it is produced on surfaces of the body where it is necessary for the protection of sores, by covering the granulations.

Symptoms of Ulceration.—In acute ulceration the pain is severe, and the irritative fever considerable ; but in the chronic the pain is less, and the fever is of the slow or hectic kind. If you ask the patient, he will tell you the pain is of a gnawing kind, as if there was insects feeding on the part.

With respect to the appearance of the ulcerated part, it looks as if it were worm-eaten ; the surface is rough and very irregular.

Extent of Ulceration.—Sometimes a very considerable portion of the body is removed by ulceration. Here is an example, on the table, of an ulcerated tibia. See to what an extent ulceration has removed not only the cancellated structure of the bone, but the shell in which that structure is contained. Here is another example in which a great part of the tibia has been removed ; the ulceration has extended six or seven inches, so that little more than the fibula remains ; such is the power of the absorbent vessels of feeding upon the body and upon themselves.

Its rapid extension.—The ulcerative process is sometimes ex-

tremely rapid in its progress ; as much of the body will be destroyed in a few hours, as it will require weeks and months to repair.

In proportion to the extent of surface destroyed will be the difficulty with which that surface is closed. Something will depend also on the form of the ulceration, and the kind of surface exposed ; but the general rule is, that the difficulty of the restorative process is proportional to the extent of surface destroyed.

Laws of Ulceration.—It is a curious law with respect to ulceration, that it has a tendency to the nearest external surface. This is a law that is attended with the most salutary effects ; for, if it were otherwise, the body would very frequently be destroyed by the ulcerative process. In consequence of this tendency, matter formed at a depth in the body, finds its way through the integuments, instead of proceeding through more important parts. Many examples may be given of this law. One of the most remarkable is this : Matter forms not unfrequently behind the sternum close to the pleura and pericardium, which membranes are extremely thin. From the proximity of these membranes it might be expected, that the matter would generally open into the pleura, and, by discharging itself into the cavity of the chest, destroy life. Instead of this result, however, the pleura undergoes no other alteration than that of becoming thickened, and while it is acquiring this addition of substance, the process of absorption is going on in the inner part of the sternum, an aperture is formed through it, and the matter makes its way through the bone and integuments, rather than through the pleura and pericardium. The same circumstance occurs to the peritoneum. If matter be formed on the abdominal muscles, the peritoneum is very rarely absorbed to admit the matter into the cavity of the abdomen ; but the matter makes its way through the integuments, and finds an outlet on the surface of the body.

So in an abscess of the liver, the matter is discharged, not through the skin, which is a more remote surface, but into the cavity of the stomach or intestines, which may be considered as the nearest outlets, from which it is thrown up by vomiting, or discharged with the fæces.

These effects are produced in the following manner : the surface of the abscess becoming united with a portion of intestine or stomach by the adhesive process, the ulcerative action commences ; by which a communication is formed between these surfaces, and the matter is discharged in the manner before mentioned, without danger, or with less danger to life.

The same thing happens in absorption of the bones. Thus, in ulceration of the tibia, the matter breaks through the skin ; on that surface which is only covered by skin and periosteum. This is a law in some degree depending on the greater irritability of those parts which are nearest the surface of the body. The most external surfaces of the body are more irritable, and more subject to vicissitudes of action from corresponding changes of temperature than other parts of the body,

and they give way to ulceration more readily than those which are more deeply seated, and possess more equality of circulation, and of temperature. Another reason is, that the adhesive process glueing the more internal parts to each other, they become united, and in this way form a considerable solid ; but the more external surfaces have no such support. An instance of this is found in the adhesion of the pleura to a lung, so as to form one structure. It may be considered, then, as a law of the animal economy, that the ulcerative process has a disposition towards the nearest external surface of the body.

New Parts prone to Ulceration.—Those parts of the body which are newly formed, are more liable to be absorbed than those which have long existed. A part covered by a cicatrix proceeds rapidly to ulceration, because it is more weakly constituted than those which have existed longer. The irritability of a part is proportional to its weakness : and those which are weak and irritable, fall most readily into the ulcerative process.

Examples.—To take a familiar illustration ; when a child labours under symptoms of constitutional derangement in dentition, you cut its gums. You do so, not for the purpose of making an immediate passage for the tooth, but because, when the gum by the adhesive process heals, a cicatrix is produced by this little operation which is very readily absorbed ; and the result is, that when the tooth rises, the child cuts it with much less pain and irritation, than it would otherwise have done.

If a man have inflammation in his leg, and this is seated near a place where ulceration previously existed, the scar produced by the old ulcer gives way much more readily than the original skin. I have observed, that if a patient under gonorrhœa has had an abscess in the urethra, which will now and then happen in consequence of suppuration of the lacunæ, or if from that cause he has had an abscess in the scrotum, or on the side of the penis, a second gonorrhœa will be sure to be followed by a similar abscess. Proceed with as much care as you may, guard against inflammation with all possible caution, and yet if abscess existed in the first gonorrhœa, it will generally return in the same part in a succeeding disease of the same kind.

Some of the most remarkable instances of the readiness with which the process of absorption attacks newly formed parts, may be seen in Lord Anson's Voyage round the World ; a work which, I doubt not, is generally known to you. It is a most able and entertaining publication ; and if any student has not read it, I can strongly recommend it to his perusal ; for while professional knowledge should undoubtedly be the first object of your pursuit, general literature should not be neglected, and is so far from being incompatible with that primary object, that it cannot fail to enlarge your views, and give efficacy to your professional researches. So intimate is the connexion between every object of useful and scientific inquiry, that there is hardly one branch of knowledge which does not in some measure throw light and

illustration upon another. The circumstance which I am about to mention may illustrate this remark. Lord Anson's book is one of the most interesting works which has appeared on nautical subjects; nor is it without its use as illustrative of a principle in surgery. Lord Anson's expedition to the Pacific Ocean was undertaken with a view of destroying the power of Spain in that quarter. As he was obliged to sail sooner than he expected, many of his crew were invalids, some having cicatrices, and others having had fractured bones, long since united. In his passage round Cape Horn, he encountered very severe weather; many ships were obliged to return, some were lost, and the crews of those which succeeded in getting at last to the Isle of Juan Fernandez, had suffered great hardships. In doubling Cape Horn, the crew suffered severely from attacks of the scurvy; and it was remarked by the chaplain, who was an observing man, though he knew nothing of our profession, that the men who had ulceration before, were attacked with ulcers in the same parts; and if their bones had been formerly fractured, they became disunited. This does not excite surprise, because we know that scurvy produces the ulcerative process, attacking the gums, causing profuse bleeding, &c.; that the ulcerative process has a stronger disposition towards parts newly formed, and that in this case, therefore, it appeared in parts where ulcers had formerly healed, and in disunited limbs where callus had previously formed. When the men obtained fresh vegetables, &c., on shore, they recovered their health; their bones united, and their sores healed. There cannot be a better example than this, to show the readiness with which newly-formed parts ulcerate, when compared with the original organs of the body.

Parts remote from the Heart more readily ulcerate.—The parts more remote from the heart ulcerate more readily than those in the vicinity of it. This circumstance led me to say, that when the vital action is feeble, and the power of the circulation diminished, we find a greater disposition to the ulcerative process than otherwise. Thus for one ulcer in the arm, we find twenty in the lower extremities; and it cannot but have been observed in going through our wards, the great number of sore legs, compared with ulcers of other parts.

Parts little organized ulcerate with difficulty.—In those parts which are endued with little vascularity, ulceration takes place with difficulty. This is the case with tendons. Tendinous parts possess very little blood; very few arteries of absorbent vessels are distributed to them. Hence the process of absorption proceeds with great difficulty, and tendons will slough to a great extent, rather than become absorbed. This circumstance must influence our practice. In abscess, under the fascia, an incision should be made as soon as possible through the covering, to liberate the confined matter. So in abscess of the finger, when the constitution suffers because the theca will not give way to the process of ulceration, and the nervous system becomes irritated by the pressure of confined matter, an early incision should be

made to liberate the matter, and give relief to the constitution. The same practice should be pursued in abscess of the palm of the hand.*

Use of Ulceration.—The ulcerative process is useful to the animal economy, in removing extraneous bodies from the system. Thus a ball lodged in the body is removed.

Case.—A gentleman who had formerly received a wound above the zygomatic arch from a ball, called on me, having a swelling on the side of his face. I asked him whether he thought the ball was there? to which he replied, no. Upon cutting on it, I found that it was the ball by which he had been wounded some years before. It had travelled beneath the zygoma to the middle of the cheek, on the surface of the parotid gland, from whence I removed it; perhaps it was assisted in its course by the action of the temporal muscle.

Case.—I saw a boy at Walworth who had been attending a target, at which some volunteers had been firing: he thought himself safe at a distance of thirteen yards; he was mistaken, however, for one of them shot him in the collar bone. Some months after he came to Guy's Hospital, and I removed the ball from near the middle of the upper arm. The ball, by its pressure, had occasioned suppuration and ulceration, which had enabled it to travel to the situation from whence I took it, and the matter was discharged at the wound by which it entered.

It is useful also in the exfoliation of portions of bone, in separating parts which would otherwise remain in the body, perhaps during the life of the individual. In three or four months a considerable portion of exfoliated bone will be separated by the ulcerative process. Thus in the other Hospital the whole of the leg has separated. By my advice nothing has been done, and the process of nature has been left to take its course, and has been performed in eight months. The bones themselves will separate by the process of exfoliation, and thus nature will herself perform the operation of amputation without loss of blood, and with little danger to life.

I shall now proceed to the consideration of

ABSCESSSES.

Definition.—An abscess is a collection of matter in a cyst, produced by inflammation.

Its formation.—What happens in the formation of an abscess is as follows: First, there is an inflammation of the adhesive kind in the

* The blood-vessels ulcerate with extreme difficulty, and they may be occasionally seen completely exposed, from the destruction of the surrounding parts by the ulcerative process. In the extensive ulcers, which sometimes occur in the groin of debilitated patients, from venereal affection, I have several times seen a portion of the saphæna major vein, as well as a part of the femoral vessels, exposed; and I have a cast in my possession (taken after death from a young woman who died in Guy's Hospital, from an extensive sore of this description), in which this exposure of these vessels is very extensive.—T.

cellular tissue, by which the different cells of the cellular membrane become filled. A slight ulcerative process follows; and the inflammation still proceeding, a little cavity is formed by the ulcerative process: a space being thus produced for the effusion of matter occasioned by the second stage of inflammation. A drop of matter is, at first, secreted into the cavity; and as soon as it is poured out, its pressure occasions an increase of the ulcerative process which adds to the cavity previously formed; fresh matter is then produced, and the surrounding solids ulcerating, it is accumulated, but it excavates chiefly on the side towards the skin, and very little in the opposite direction; a circumstance which shows that matter has no power of corroding, as was formerly supposed, when it was thought that matter acted chemically on the solids like an acid alkali.

Danger of Abscesses:—Abscesses are dangerous, according to the following circumstances.

From their Size.—First, from their size. It is not, however, the quantity of matter produced which renders them dangerous; but the difficulty which nature has in repairing the devastation made by excavation of the solids, from the pressure of the matter.

An abscess may contain a great quantity of matter, and the constitution may have been scarcely affected by it; but very soon after it is opened, the constitution begins to suffer. It is not, therefore, the quantity of matter, but the process of restoration after the evacuation of the matter, which affects the constitution. The largest abscesses which occur in the body are those of the liver. Patients will sometimes recover from abscesses of this part, in which immense quantities of matter have formed. I remember one of enormous magnitude, from which the patient recovered.

Case.—Dr. Saunders, the lecturer on medicine at Guy's Hospital, asked me to see a woman who had a large abscess in the side. I made an opening into it with a lancet, and it discharged a surprising quantity of matter, as much as would fill two-thirds of a wash-hand basin; but I have heard, indeed, of cases of much larger quantities of matter having been discharged. After pressing out the matter, I passed a roller tightly round the abdomen, with a view of producing the adhesive process, which now and then occurs. I did not see the patient again; but some days after I met Dr. Saunders, who asked me how I thought the patient was proceeding: I told him I supposed he asked me, because he thought me very sanguine; and he replied, that I should be gratified to learn, that the woman was doing extremely well. In fact, no more matter was discharged, and the patient got well, without any bad symptoms. I have mentioned this case, because it may guide your practice when you are operating upon large abscesses, and show you the propriety of endeavouring to procure the adhesive process, by bringing the sides of the abscess together. Very large abscesses sometimes terminate favourably, but in a great number of cases they destroy life.

From their Number.—The next circumstance which renders ab-

scesses dangerous, is their number. Thus a great number of little abscesses on the surface of the body, in small pox, frequently destroy life. Here nature performs the suppurative process; the pustules die away, and the cuticle is separated from the surface of the body; but nature has not the power, in many cases, of repairing the destruction of the cutis; the want of which occasions great irritation, and the patient dies, as if destroyed by a burn or scald.

From their Situation.—Abscesses are also dangerous from their being situated in vitally important parts, such as the brain, heart, or lungs. Abscesses in the brain are very rarely recovered from, nor are those of the heart. Abscesses of the lungs, in some constitutions, are dangerous, but are most recovered from, when the quantity is large.

From their Pressure on important Parts.—They are dangerous even when they are not seated in parts of vital importance, if they press on organs essential to life. A woman was admitted into this hospital for a complaint in the throat, occasioned by swallowing a pointed bone. All she complained of at first was, a soreness in the throat; but she was shortly after seized with difficulty of breathing, which increased until she died. On examination after death, I found, upon making an incision into the pharynx, that between it and the fore part of the vertebra, a large abscess had formed, which, by pressing the pharynx forwards on the epiglottis and glottis, occasioned difficulty of breathing, and in the end destroyed life. Shortly after this, Dr. Babington came to Guy's Hospital with a friend of his, who was labouring under great difficulty of breathing. He requested me to examine his throat; having put my finger on the back of the pharynx, and felt fluctuation there, I told him that this was a case, of which I had seen an instance, in which the patient had died from a collection of matter formed in the same situation. I immediately procured a trocar, and passing it into the pharynx, a considerable quantity of matter was discharged, and the patient was relieved. This was a case, which, but for an operation, would probably have terminated fatally by the pressure of the matter on the glottis and epiglottis. In the same manner, abscesses in the perineum or between the prostate gland and the rectum, will, by their pressure on the urethra, sometimes occasion retention of urine, and destroy life.

Thus we find that abscesses, though situated in parts not of themselves vitally important, sometimes become dangerous by their pressure on more important organs.

The danger attending the formation of abscesses arises from their size, number, and seat, or from their pressure on important parts: there is also another danger, if abscesses occur between the bones and the covering of bones. Whenever bones form the boundary of abscesses, such abscesses are tedious in their cure, and, in many cases, dangerous. Thus it is in psoas abscess: in this disease the matter begins to collect on the fore part of the vertebræ, and proceeds through the psoas muscle, till it reaches the groin, where it makes its appearance just below Poupart's ligament; and from examination of these cases

after death, the vertebræ are found ulcerated. It is not my intention now to enter into the consideration of psoas, or lumbar abscesses, as they will be treated of on another occasion ; but I just mention the complaint, to show the danger of abscesses between bones and their coverings ; and that the reason is, the union between the soft parts and bone is with difficulty produced, and the process of restoration is extremely tedious.

Abscesses are acute or chronic.

Acute.—The adhesive inflammation first occurs : this is succeeded by the suppurative ; and lastly, the ulcerative process ; and it is about three weeks, from its commencement, before matter is discharged.

Chronic.—But chronic abscesses are slower in their march : take, for instance, the psoas abscess to which we have alluded : it is often six months before matter makes its appearance in that complaint. If a person applies with a psoas abscess, and you ask how long he has had pain in his loins, he will tell you for four, five, or six months. There are varieties in the irritability of different constitutions ; but when you see a man with swelling in the groin, which, if he coughs, rebounds under your hand, and has a fluctuating feel, and who, for four or five months, has had pain in his loins, you will say, that he has psoas abscess ; so these are the criteria by which you are to know it. Chronic abscesses sometimes occur in the female breast.

Case.—A Lady was sent to me from Sussex some years ago to have her breast removed : knowing the surgeon who had recommended this person to me to be an intelligent man, I did not at first attentively examine the breast, but said to the lady, I will call on you soon, and perform an operation. I fixed the day, and was about to perform the operation, the patient being seated in a chair before me ; when I said to the gentleman who was assisting me, I think that I feel a fluctuation in this swelling, at least I will not proceed to remove the breast till I have ascertained the fact. I made a small opening into it, and a quantity of matter gushed from the part. Thus a chronic abscess had existed for a considerable time.

Case.—Very lately, while visiting Guy's Hospital, one of the young gentlemen brought me a woman who had a chronic tumour of the breast. On examining it, I perceived a slight fluctuation, and stated that most probably it contained matter, but was told, in reply to this observation, that it had existed for several months. I said, however, that is no proof of the absence of suppuration ; I made a puncture into it, and let out a quantity of matter, and went away smiling. I merely mention these cases, to put you on your guard ; for I have seen two tumours of the breast removed, which were only chronic abscesses ; and thus, from an ignorance of this circumstance, you might subject your patient to a cruel operation, where a small incision would have done.

Treatment of Acute Abscess.—In the treatment of acute abscesses, the best medicine you can give is the liquor ammoniæ acetatis, sulphate of magnesia, and opium, of which give small doses, three or four

times in the day. By this medicine you lessen irritation, and expedite the suppurative and ulcerative processes; no medicine that I have observed gives so much relief. The sulphate of magnesia prevents any costiveness, the opium tranquilizes the nervous system, and lessens pain. The local treatment consists in the application of fomentations and poultices, to promote warmth and moisture. A greater quantity of blood is sent to the part, and a relaxation of the vessels takes place; this expedites the suppurative process, and then the ulcerative follows with more ease. The kind of poultice to be applied to the part is of little importance, as it is only the medium of applying heat and moisture; linseed meal and water, bread and water, and bread and milk, may be either of them used; the part must be covered with oil-silk, for by its assistance the heat of the part is preserved, and evaporation prevented. It is desirable in the suppurative process to prevent evaporation; oil-silk I generally use in private practice; it is clean, agreeable to the patient, and most conducive to his advantage.

Before proceeding to the consideration of chronic abscesses, I will say a few words on opening abscesses. If an acute abscess goes through its different stages without great pain or constitutional irritation, and is not likely to be of great magnitude, the best practice is to leave it to nature.

Mode of opening Abscesses.—Acute abscesses beginning under aponeurotic fasciæ, ought to be opened as early as possible, the earlier the better; the moment matter can be felt to fluctuate, it is advisable to make a free opening, both as regards the constitution and the part. Whenever the matter is formed close to a bone, it will be right to open the abscess, excepting in cases where it occurs between the cranium and pericranium, from severe courses of mercury. Mercury will inflame the periosteum (and the pericranium is a part of the periosteum) to a greater degree than the venereal disease itself; and in those cases in which a fluid exists between the pericranium and bone, unattended with any blush, do not open it: it will be removed by purging and giving bountifully the decoction of sarsaparilla. But when matter is formed, and there is a blush on the skin, it will not be absorbed, an opening must be made, exfoliation often takes place; but when there is no such blush, beware of opening the swelling.*

Treatment of Chronic Abscesses.—The treatment of chronic abscess is very different from the acute. In the last case, you wish to dimin-

* About a year ago, I was asked to visit a gentleman who was suffering from the formation of abscesses between the pericranium and bone. He had been taking large quantities of mercury, for syphilitic complaints, and during its exhibition the pericranium became inflamed. I found, on examination, several tumours, of various sizes, situated on different parts of the cranium, and in two or three of them a distinct feeling of fluctuation; more particularly in the largest, which had formed on the forehead. Although the integument was slightly discolored, the abscesses entirely disappeared, without the matter being discharged, by the free use of sarsaparilla with minute doses of the oxy muriate of mercury.—T.

ish the state of excitement in the constitution ; and, in the former, you do all you can to give it additional powers, by allowing a generous diet and giving the ammonia and bark : the ammonia is the medicine on which the principal reliance is to be placed. You know that of late bark has not been much used ; but we are apt to run into extremes :—bark assists the suppurative process, and a generous diet must be allowed in order to increase the action of the parts, by giving tone to the constitution. Stimulant poultices should be applied, and the best I know is the muriate of soda (common salt) and water ; a table spoonful of the salt to a pint of water, and the poultice should be wetted with this. Yest and oat-meal, vinegar and flour, each of these expedite the process of suppuration. In indolent cases it is customary to apply stimulant plasters ; and the best is the empl : galb : comp. ; it is stimulating, and consequently excites the action of the part ; the emplast : ammon : cum hydrarg : and the emplast : thuris comp : are also used. The latter is more tranquilizing, and in general excites slight perspiration over the part ; similar in its operation to the soap cerate, which is also of use. These then are the remedies, local and constitutional, to be used in chronic abscesses ; but it remains to be considered how chronic abscesses are treated when it is necessary to open them. Suppose you are called to a case where there is a collection of matter under the fascia lata of the thigh (the largest abscess in the body), extending, as it often does, from above the knee to the trochanter major, what would you do ? Certainly it is to be opened—make an incision, half an inch in length, and discharge all the matter you can. Having done this, apply a roller to cover the thigh, with the exception of the opening ; the result of this is, in many instances, that adhesive inflammation is excited, and the sides of the cavities often readily unite ; always taking care, in the application of the pressure, to leave the mouth of the wound uncompressed. The same directions are to be attended to in collections of matter, which are to be met with under the tendinous expansion, which covers the muscles of the leg and fore-arm ; * the object is, to endeavour to produce the adhesive inflammation, as in the case of abscess in the liver, that I stated to you, from which the matter was evacuated by the puncture of a lancet, and afterwards by pressure ; the adhesive inflammation was produced, and the recovery of the patient was effected. This then is to be your practice—to endeavor to procure a union of the sides of the cavity by the adhesive process.

Prevention of Scars.—The prevention of scars is a great object, particularly in exposed parts of the body ; this may appear of little consequence, but it certainly is not so ; scars from abscesses in the necks of females, excite in the minds of most of our sex a reluctance to associate with them ; and thus many a fine young woman may, by

* The opening in those cases should be made at the most depending part of the abscess, that the matter may be discharged with greater facility ; and if any fresh formation takes place, that it may have a free exit, and not disturb the approximation of the sides of the cyst.—T.

such scars, be doomed to perpetual celibacy. No part of the practice of surgery has been more faulty than the manner in which abscesses of the neck have been treated. I have seen on one side of the neck large scars from abscesses that had been badly managed; whilst on the other side, where the treatment had been more skilful, scarcely any vestige of a wound was to be seen. I have from very early practice, and subsequent experience has proved to me its use, been exceedingly careful in the management of these cases. Aperients, with calomel and rhubarb, should be given; evaporating lotions should be used: you must be strict as to regimen and diet; the food must be nutritious, but not stimulating. The best mode to adopt in these cases, is to open the abscess before the skin be much affected, and as soon as a blush has appeared; thus scars will in general be prevented. It is desirable, in opening the tumours, to use a very fine knife, for two reasons. 1st. A small opening is made; 2d. It does not alarm the person. The knife I always use, has the blade an eighth of an inch wide, and it appears to the patient as a needle.* When you press the sides of the wound, take care to squeeze out all the solid flakes of matter to be met with in scrofulous tumours. If this be not attended to, they will at last slough; but if, on the contrary, you carefully avoid leaving any of that unorganized substance, adhesion will take place, and the wound will heal. Almost every thing, in these cases, depends on getting rid of the solid matter. Bread poultices, mixed with a sulphate of zinc-lotion and spirits, may be afterwards used.

Case.—Whilst living in Broad Street, in the city, a lady came to me with a tumour on the side of the neck; I perceived on the opposite side several scars; I said, "Will you allow me to try if I can prevent a scar?" She answered, it was for that purpose she had consulted me. Warm poultices had been used on the previous occasions: I made a very small opening, such as is made in bleeding, and squeezed out the contents, and she got well with scarcely a perceptible scar.

It is of the highest importance, then, to endeavor to prevent those appearances, which, on the exposed parts of the body, produce such painful feelings. In the higher orders of life particularly, a child with scars on its neck would be almost excluded from society. There is a point of great importance to be attended to, that is, the direction in which you make the opening; always make it transversely, and not in the axis of the neck; for, when the wound heals, it will be scarcely seen among the creases or folds of the skin. One more observation on this subject; let me entreat you not to open these tumours when they have a purple blush upon them like the hue of a grape: the skin is thin and will slough, and if you then open the tumour, you will bring discredit on yourself. If the sides of the abscess do not unite in any part, a little injection of sulphate of zinc, or copper, may be used.

There are two other points connected with this subject, which I will mention to you, in conclusion.

Causes of Hectic.—First.—The causes of hectic fever. You are all aware that rigors followed by heat, and by perspiration, attend the con-

tinued formation of matter ; these occur once or twice in twenty-four hours, according to the irritability of the part and constitution ; and had it been asked thirty or forty years ago, on what it depended, it would have been answered, absorption of matter into the constitution ; and some of the old surgeons used to put sponge to the surfaces of wounds to absorb the matter, and prevent its being carried into the system ; but it appears to have no power on the constitution.

There is no doubt, but that the inoculation of putrid matter will sometimes produce fatal consequences ; but the proofs that the absorption of common matter into the constitution does not produce irritative fever, are,

First. It is not during the accumulation of matter in abscesses, that the fever appears ; but after abscesses have broken, the patient is attacked with it ; certainly, the formation of matter will be attended with a slight fever, but not of the hectic kind ; the tongue is clean, the pulse very little affected, and the person but slightly deranged ; but after an opening is made into the part, constitutional irritation comes on, and life is then endangered.

2dly. The degree of hectic fever is not at all proportionate to the size of the surface on which the matter is formed. Look, for instance, at a large wound of the leg ; the person will take his usual exercise, and feel little or no inconvenience ; whilst a small ulcer on the lungs, or intestines, produces hectic fever of the most violent kind.

Case. — 3dly. Hectic fever often appears when matter has not formed. A woman, who had her leg amputated for a disease in the ankle, came into the Hospital for a pain in the knee of the same side. The symptoms of constitutional irritation were severe ; the knee-joint was a little enlarged, violent pain existed in the part, with great constitutional disturbance, and she was obliged to submit to an amputation above the knee. There was no matter formed in the knee, but in the condyles of the thigh bone the ulcerative process had commenced ; and the hectic fever was the effect, not of a disease of the knee-joint, but of the cancellated structure of the thigh bone.

In some cases matter has been absorbed, and hectic fever has not been produced. Some years ago, Mr. Cline tried the effect of digitalis on a boy sixteen years old, who had a psoas abscess ; the size of the tumour diminished, the skin became flaccid ; but as soon as the digitalis was left off, the matter returned, and, during the trial of the medicine, the pulse was lessened, but no hectic fever intervened ; therefore, the belief of the absorption of matter being the cause of hectic fever is unfounded ; for it is merely the result of the efforts of the constitution to repair an injury, or to cure a disease.

On the Influence of Air when admitted into Abscesses.—The last circumstance that I shall mention is, the influence which the admission of air into cavities has in producing local irritation ; it is my duty to state to you my opinion ; you must think for yourselves, only do not rest contented with thinking ; make observations and experiments, for without them your thinking will be of little use. When an opening is made

into an abscess, very slight irritation supervenes till the third day ; I say the third day, because generally it is not until that time the constitutional disturbance arises. Surgeons of former times, in their opinion on this subject, maintained that it was the admission of air which produced the local irritation attending the opening of abscesses ; and endeavoured to cure hydrocele by inflating it after the evacuation of the water. But what was the consequence ? when the air became absorbed, the adhesive inflammation had not been produced, and the hydrocele returned. Again, experiments have been made on animals ; air has been blown into the cellular membrane of a dog ; nothing follows but a temporary stiffness, from the distension of the skin ; and when the air is absorbed the crackling goes off without adhesive inflammation.

Experiment.—Dr. Haighton made an ingenious experiment some years ago : he inflated the abdomen of a dog from an opening in the tunica vaginalis ; and this mode of doing it evinced his knowledge ; for in the dog, and many other animals, there is a communication with the abdomen from the tunica vaginalis. The dog was let loose ; he was distended for a few days, but when the air was absorbed he became quite well.

Anecdote.—I know a curious circumstance which illustrates this : a butcher was drawn to serve in the militia ; and being unwilling to become a soldier, he went to the regimental surgeon, and said that he had a large rupture, which disabled him ; he showed it, and the surgeon sent him away. This man had made a puncture just above the scrotum, and inflated it with a blow-pipe, used in inflating the cellular tissue beneath the integument before flaying : the man himself mentioned it afterwards as a good joke.

What takes place when a lung is wounded and air is admitted into the cavity of the chest ? The air inspired enters into the cellular tissue, the face and body become bloated ; but it is afterwards removed by absorption, without producing any inflammation.

He who holds that the admission of air produces the irritation attending the opening of abscesses, takes a narrow and partial view of the case ; for the cause of the irritation is as follows : If a wound be made into any cavity of the body, be it an abscess or a natural cavity, soon after the vessels of the part are divided, inflammation arises to heal the wound, whether it be exposed to the air or not. If it heal by adhesion, the influence is slight and directly terminates ; but if the adhesive inflammation be insufficient or imperfect, then a suppurative inflammation follows, and granulations arise, which process produces violent influence both upon the part and constitution. The cause is, therefore, the division of the blood-vessels, and not the presence of air ; and its degree depends upon the ease or difficulty with which the injury is repaired.

LECTURE VII.

ON GRANULATION.

WE have endeavoured to describe the first mode in which the union of wounds is produced ; namely, by the process of adhesion. We shall now proceed to consider the other mode of union of divided parts ; namely, that by granulation ; for the two processes which nature institutes for the purpose of filling up ulcers, and for the cure of wounds, are adhesion and granulation.

Definition.—A granulation is a newly formed substance, generally red in colour, and having the power of secreting pus.

Its Formation.—The mode in which a granulation is produced is as follows ;—it is a process very similar to adhesion, but differing from it in one respect.

When an abscess has been opened, or a wound has been produced, if the abscess be not immediately closed, or if the edges of the wound have not been brought together, inflammation is excited, and it occasions an effusion of the fibrin of the blood upon the surface of the wound. This fibrin is poured out in a layer which covers the raw surface. The layer of fibrin, or adhesive matter, soon becomes vascular ; for blood-vessels, which are elongations of the vasa vasorum of the divided arteries and veins are forced by the action of the heart into the fibrin which has been deposited, and this layer consequently becomes organised. The difference between the mode of union by adhesion and granulation is, that, in the latter, the vessels shoot through the layer which has been thrown out, terminating by open mouths on the surface of the newly-formed substance, and secreting pus, at the same time that more fibrin is effused. The fibrin, which is poured out with this purulent secretion from the vessels, forms a second layer, into which the vessels supporting the first deposit of fibrin become elongated, and are the means of supporting the second covering, terminating as before, by open mouths on the surface of the substance effused. In this manner layer after layer is formed until the cavity becomes filled.

The difference in the process may be easily explained. Suppose an abscess be opened ; the result is, that adhesive inflammation is produced on the internal surface of the cavity. A layer of adhesive matter is thrown out ; and if the sides of the abscess are brought together by a roller, you may often prevent the future formation of matter. But if the union by adhesion does not take place, then granulations are formed as I have described.

Character of Granulations.—The characters by which granulations are distinguished are these : their surfaces are uneven, they are generally red in colour, and they secrete matter.

Their Vascularity.—The vessels shooting into granulations are very numerous. If you inject an ulcer of the leg, the great degree of redness in the granulating surfaces is accounted for, by the number of vessels divided into radiated branches, which enter the granulations, producing the arborescent appearance observed in them.

In examining the structure of granulations, they appear to become vascular in the following manner. Arteries enter at the base of the granulations and then divide into radiated branches; from these vessels pus is secreted and an incrustation is formed, produced by a layer of adhesive matter, on the surface of the granulation. This is a little difficult to conceive; it is a circumstance, which I believe, has not been observed, and which I learned in the following manner: I took a portion of injected ulcer from the arm, threw it into alcohol, in order to observe its vascularity. After it was immersed in the alcohol, it was so opaque on its surface that no blood-vessels could be seen. It was the fibrous matter covering the surface of the granulations which had not yet received the blood-vessels.

A granulation may be considered as a gland, and the surface of an ulcer merely as a glandular surface. A gland is a part of the body in which secretion proceeds from the extremities of the arteries, and the blood which is not employed in the secretion is returned to the heart by means of veins which accompany the arteries. So in granulations, the arteries throw a quantity of blood near the surface of the wound, and there secrete pus. There is a vein accompanying each artery, and the fluid conveyed by the vessels is partly converted into pus on the surface of the ulcer, and is in part returned to the heart by the vein. Whilst the pus is secreting, fibrin coagulates upon the surface of the ulcer.

Their Powers of Absorption.—Granulations are not good absorbent surfaces in ulcers recently formed; but if the ulcers have existed for any length of time, the absorbent vessels readily take into the system some substances which may be applied to them. In this way we frequently see persons salivated by the use of injections of the oxymuriate of mercury. It is not an uncommon practice to inject a solution of oxymuriate of mercury into sinuses, for the purpose of stimulating the vessels to produce granulations. If the sinus has existed for a considerable time, the oxymuriate of mercury is frequently absorbed, and the mouth becomes affected in the same manner as if the mercury had been absorbed into the system by rubbing it into the skin, or taking it into the stomach. This proves that old granulating surfaces have the power of receiving by absorption a fluid of this description.

I have known what is commonly called the black lotion, which is composed of the liquor calcis, and the submuriate of mercury, when applied to the surface of ulcers, produce an effect upon the mouth in persons who are easily affected by mercury. I believe that the lotion of the liquor calcis and calomel often produces good effects in sores, by the mercurial action which it excites in the system, and not merely by its local effects on the sore to which it is applied. Ulcers are,

however, frequently the means of producing baneful effects upon the constitution, by the readiness with which they absorb some substances which are applied to them. Thus, arsenic applied to the surfaces of sores is very frequently absorbed into the system; and on this account arsenic is to be regarded as a very dangerous remedy. With respect to the use of arsenic as an internal or external remedy, it ought never to be employed without extreme caution, and unless the patient is watched from day to day.

Case.—I remember a case, in the other Hospital, of a patient, who was brought in with a fungus in the eye, and who was under the care of Mr. Lucas, a man of skill in his profession, and the father of the present surgeon of that name. Mr. Lucas ordered a solution of arsenic to be applied to the part. After it had been used for three days, the man complained of pain in the stomach; but this was not supposed to arise from the use of the solution. The application was continued; the pain in the stomach became excessive; convulsive tremors of the muscles succeeded, and the patient died. It was quite clear that he died from the influence of arsenic in the system; and, upon examination of the body after death, the stomach was found in the highest degree inflamed, and exhibiting the peculiar appearance which is produced by arsenic, and not by poisons generally. I believe, therefore, that this person died from the application of the arsenical solution.

Quacks are in the habit of destroying tumours of the breast by the use of arsenic. Women will undergo any torture which is not inflicted by a knife, rather than submit to an operation that would not give them a tenth part of the pain which they suffer from such applications. They apply to a person who tells them of a number of cures he has performed by means of a specific used for the purpose of destroying cancerous affections; and indeed they very frequently destroy the part and the patient too. Mr. Pollard, the surgeon, told me of a person, in town, who applied an arsenical preparation for a scirrhus affection of the breast, and the patient died in less than a week.

I had myself occasion lately to perform an operation for a scirrhus breast, to which arsenic had been applied. I asked the woman, which gave her most pain, the application of the arsenical preparation, or the operation. She replied that the pain of the operation was not greater than that of the application, and that the arsenic had been applied ten or eleven times. These remedies become absorbed and produce derangement of the stomach, the intestinal canal, and the nervous system, and sometimes paralysis.

Case.—While I am on this subject, I will mention a case to you, which I should scarcely have believed if it had not come within my own knowledge, that of Sir William Blizard, and of other surgeons. A person in this metropolis happened to have bow shins. A part of his duties was to teach young ladies to draw and paint; and in the prosecution of this branch of his profession, he found his bow shins, as he himself declared to me, a very great evil. He felt that his merits were less appreciated, and his instructions less kindly received, by reason of

the convexity of his shins ; he was persuaded, in short, that his bow shins stood between him and his preferment. Under this impression, he went to a very noted person in this town, and said to him, "Pray, Sir, do you think you can make my legs straight?"—"Sir," said the Doctor, "I think I can : if you will take a lodging in my neighborhood, I think I can scrape down your shins and make them as straight as any man's." A lodging was taken ; the father of the patient assisted in the operation ; and the father and the Doctor took a turn in scraping down the convex shins.

A great deal of rasping was required ; an opening of very considerable extent was made in the shin, and an instrument, which was at that time contained in the Surgeon's trephining case, called a *rougée*, was employed to scrape the shin bone. When the Doctor was tired of rasping, the father took a spell. At last, the shell of the bone became so thin, that the Doctor said they must proceed no farther with that leg. The other leg was then rasped in a similar manner, and thus large wounds were produced in both of the skin bones. The surfaces granulated very kindly, and very little exfoliations of the bones took place ; but, unluckily, in a part of this process the Doctor applied arsenic upon the limb. It was in consequence of the effects of this application that I saw the patient. The arsenic was absorbed into the system, and he became paralytic in his arms and lower extremities. A great number of exfoliations took place in his legs ; and he showed me a box in which the exfoliations were contained. I recommended him to go into the country, where he stayed for some time, and got rid of his paralysis. This case made a great noise in town ; and there were some surgeons who expressed a strong wish to prosecute the doctor. I recommended, however, that no steps should be taken until I had seen the patient himself ; and when he next came to me, I asked him whether he thought his legs improved, and if he would undergo the same operation, at a similar hazard of his life, to have his legs made a little straighter. He replied that he would ; and under these circumstances I was of opinion, that as the young man was content, it was a folly to think of prosecuting the doctor. Some time has elapsed since the case occurred, and the transaction is now almost buried in oblivion. The person who underwent the operation still lives, and is pleased with his improved legs ; and the doctor lives also, and is well known to most of you, at least by name.

Opium, when applied to the surface of sores, is very readily absorbed into the system. I believe that it is often a very useful application to the surface of wounds. A case of tetanic affection happened in a child, whose leg had been amputated by Mr. Lucas, the late surgeon of Guy's, and the application of opium to the stump gave more immediate relief than I ever remember to have witnessed. It relieved the spasms, and, as I believe, saved the child. If opium, applied to the surface of sores, be absorbed into the system, it produces excessive costiveness, extreme pain in the head, and torpor of the system, which is only to be removed by the frequent administration of active purgatives. The

effects on the constitution, when thus absorbed, are very much the same as when it is introduced into the stomach. I have known a solution of opium, applied upon an extensive scald in a child, destroy it.*

Granulations sensible—Granulations possess nerves as well as arteries, veins, and absorbent vessels. They are sometimes extremely sensitive; but this is far from being the case in all granulations. We shudder at seeing a person handle a sore roughly, supposing that it must give the patient extreme pain. Granulations which spring from parts endued with great sensibility, as the skin, are indeed extremely sensitive; but many granulations, such, for instance, as those which arise from bones, have no sensibility. If ulceration be produced to a considerable extent, on an exposed bone, and granulations arise, a probe may be put into them, and the patient is quite insensible of your touching him; but if you apply the probe to the edge, or near the edge of the wound, he will feel it. Granulations, therefore, springing from bone, in an uninfamed state of the bone, are not sensitive. Those, however, which spring from the cancellated structure of the bones, are, sometimes, extremely sensitive. I have, at present, a patient who had a compound fracture of the leg; the fracture was attended with abscess, and a small exfoliation of the bone took place. In this case, when a probe is put down into the cavity, the granulations from the cancellated structure of the bone are highly sensible.

When the inflammation passes away, the sensibility of the part is diminished. The same thing happens with respect to granulations, springing from tendons, as the tendo-Achillis, for instance, which are perfectly insensible. So granulations arising from fascia, and the aponeurosis of muscles, are endued with little sensibility. In general, therefore, although granulations springing from parts possessed of great sensibility, are exquisitely sensitive; those arising from parts in a great degree insensible or entirely so, as tendons, are not sensitive: a circumstance which you may have an opportunity of witnessing any time you visit these large hospitals.

Granulations readily unite.—Granulations very readily unite with each other. The mode in which union is effected, is, by bringing the edges of the two granulating surfaces together, so as to produce the adhesive process. The surface of the granulations is covered by adhesive matter, and you have only to apply the two surfaces to each other to produce a union. The knowledge of this principle is very often useful in the practice of surgery. A man has a considerable portion of the scalp raised from the skull, and the pericranium throws out granulations, whilst the raised portion of scalp is also granulating.

* I have seen a temporary amaurosis produced in two cases, by the application of the extract of belladonna to the surface of irritable ulcers of a malignant character. In one case, the disease was situated in the vagina, and in the other in the rectum. The pupils of the eyes were extremely dilated, as from the application of the extract to the organ itself, and the patients were incapable of distinguishing any object for some hours. In the case of ulcerated vagina, I repeated the application, when it produced exactly similar effects.—T.

Instead of waiting for the tedious process of granulations filling the cavity, you have only to place one portion of the granulations upon the other, bind them well down with adhesive plaster, and they will often inosculate. In this manner a surface, which it would otherwise require a long time to close, will be healed in a few days. The cavity of the scrotum, after removal of a testicle, is often covered with a great number of granulations; yet by bringing the surfaces together with adhesive plaster, a wound which would otherwise require weeks in granulating, will be healed in a very short time.

It was upon this principle, namely, that of bringing together granulating surfaces, that Mr. Baynton proceeded with so much success in the treatment of ulcers; so that our hospitals are now much less filled than they formerly were with those opprobria of our art.

OF CICATRIZATION.

The next subject to which I shall direct your attention is the closing of sores by cicatrization. The formation of new skin with which a sore is covered, is called cicatrization, which takes place in the following manner.

Mode by which it is produced.—The vessels at the edge of the skin form granulations, and these unite with the granulations of the surface of the sore; those produced from the edge proceed towards the centre, and inosculate with the others on the surface of the sore, and are united by the adhesive process. The vessels become elongated from the edge of the sore, and proceed in radii from the circumference to the centre. Day after day an addition is thus made to the cicatrix, until at last the vessels reach the centre from every part of the circumference, when the process of cicatrization is completed.

It may be said by some persons, that this is not the only mode which nature takes for the formation of new skin, for it often happens that the process of cicatrization commences from the centre of the sore. If these persons mean to say that insulated portions of skin are sometimes seen in the centre of sores having no communication with its edges, there can be no doubt of the fact.

But how does this happen? It is not that the centre of the sore has the power of forming new skin, but that the new skin in the centre is produced in consequence of the whole of the original skin not having been destroyed, and granulations arise from the part of the skin which was left. This happens in irregular formed sores, where the healing process has gone to the centre, and then the sore has broken out in the circumference. If granulations arise from any portion of skin in the centre, these granulations form new skin, and an insulated portion of skin is produced, forming a part of the cicatrix.

Appearance of a newly formed Cicatrix.—When a cicatrix is at first formed, it is extremely vascular; but if it has existed for any length of time, the blood-vessels become contracted, and it is whiter

than the original skin. Hence the white appearance of the cicatrices after small-pox ; for, although they are more vascular than the original skin, when first formed, in a little time they lose their vascularity, and are endued with less living power than the surrounding parts.

Time in which an Ulcer becomes cicatrized.—The readiness with which the surface of a sore is covered in by cicatrization, depends very much on its form. A sore of a circular form, requires a very considerable time before it will heal ; whereas a sore of much greater length, but of less diameter, will heal more quickly. You may always pronounce, therefore, that a round sore will be longer in healing than a longitudinal, *cæteris paribus*. The reason is, that the vessels have to elongate much less from the edge to the centre in a longitudinal, than in a circular sore. The form of the sore, therefore, has an influence on the readiness with which cicatrization takes place.

Sores are very often difficult to heal from their situation. Thus, if a sore be situated at the back of the leg, there will be often great difficulty in healing it. Indeed such a sore can only be healed by raising the heel, and so loosening the skin, in order to give it a power of being drawn in to form a new cicatrix. By this means the vessels are more readily elongated, and continually draw the skin nearer the centre of the sore. It appears, then, that the form and situation of the sore have a very considerable influence on the healing power. Where there is much loss of skin, ulcers heal with great difficulty, because the skin must form from the edge to cover the sore, and the edges will not easily draw in.*

Contraction of Cicatrices.—After the cicatrization of an extensive sore, more especially when it has been produced by a burn, the new formed skin contracts, occasioning great deformity ; and if near a joint further mischief ensues from its motions becoming impeded. Here is a model, representing the case of a patient who had been severely burnt, and in which extensive deformity had supervened on the cicatrization of the wounds. The chin had become united to the breast, the arms to the sides, and the upper arm to the fore arm.

Now some of you might be induced to exclaim, How abominably inattentive must the medical man have been who had the care of this patient ; for all these consequences might have been prevented. If you said this, your censure would be culpable ; you have no right to say so ; for it is a case which might happen to any of you. Deformities of this kind generally arise after the process of healing is completed ; they are the effects of the contraction of the cicatrices. Here the skin is contracted, so as to pull down the chin, and evert the lip, so that the saliva runs over the surface of the breast, and is constantly excoriating

* The process of cicatrization is extremely slow on ulcers situated in those parts of the surface which become folded, or of which the position frequently varies from the motion of the joints, as in the groin from the motions of the hip, in the ham from the motions of the knee. It is from the constant disturbance of the granulations ; and on this account extensive sores in the groin, more particularly, are extremely difficult to heal.—T.

it. All these results proceed from the contraction of the cicatrices. I say this, from having seen, among many other cases of the kind, that of a child, who was admitted into Guy's, in consequence of the contraction of cicatrices, the upper arm adhered to the fore-arm; and the thumbs were drawn back so as to be immovably joined to the fore-arm.

Case.—I will mention another case. Some time ago a young gentleman, who was playing with gunpowder, happened to be slightly burned in the forehead. His father, who was a very intelligent man, showed considerable anxiety, and expressed his apprehension at the time that some horrible deformity would arise from this accident; for he had himself witnessed instances in which the eyebrows had been drawn up, so that the patient had no power of closing his eyes from a similar cause. Granulations, however, very soon arose on the surface of the forehead; the sore healed kindly, and the father was delighted to witness as he supposed the favourable termination of the case. Some time after, however, I saw this gentleman; and upon inquiring after the child, he told me, that he was very well, but that a deformity had ensued from the accident; the eye-brows were drawn up, the eyelids elevated, and the forehead was wrinkled. This took place a few weeks after the healing of the sore, in consequence of the contraction of the cicatrix; and unfortunately it was a deformity incapable of being remedied by any means which art could suggest. I have never seen a case like that represented in the plaster bust on the table, where the chin is united firmly to the breast, which was capable of being cured. There are some parts of the body, however, in which deformities of this kind may be removed; as in cases in which the thigh is united to the abdomen; where the bridle of skin may be divided, and the joint afterwards straightened; but where the bridle is broad, and not separated from the muscles, as under the chin, no operation will avail.*

Parts reproduced.—In the formation of cicatrices, the original parts may all be reproduced, except two. In the first place, new skin, though differing somewhat in texture and smoothness, is still a substance similar to the original skin. Skin may be defined to be a substance producing rete mucosum and cuticle. Are both produced by the newly formed skin? Undoubtedly. The cuticle is produced very quickly; and with respect to the rete mucosum, or colouring matter of the skin, a little time elapses before it is formed, but it is reproduced, as the following fact will show. The new skin of a negro does not become white as in Europeans, but is at first red, and after a time turns blacker than the original skin. I was struck with this in Guy's Hospital, in the case of a negro, who had been a sailor on board a privateer, and had received wounds in several parts of his body. I observed that the cicatrices were darker in colour than the original skin. We may con-

* When the cicatrix is not very extensive, and is producing much deformity, or impeding the motions of a joint, Mr. Earle has proposed that it should be removed by the knife, and a case is related in the fifth vol. of the *Medico-Chirurgical Transactions*, in which he performed this operation with success.

clude, therefore, that the skin which is reproduced is true skin ; that the cuticle is very quickly reproduced, and the rete mucosum after a longer period. The cellular membrane is also reproduced, although it has at first the appearance of a solid fibrous mass which requires some time before it is drawn into the reticular texture of the original membrane. Tendons are very easily reproduced. If the tendo-Achillis be divided in an animal, it will be reproduced in about a fortnight, or three weeks ; but it will be of greater size than the former tendon. The same takes place in the human subject ; as you may see from two specimens in our Museum, of the tendo-Achillis, which had been reproduced, and which are larger than the original tendons. Every body knows that bones are reproduced ; not only the shell of the bone, but the cancellated structure ; not only the salt or phosphate of lime, but the cartilaginous substance, in which it is deposited. Nerves are also reproduced, but there is some doubt whether the restoration of sensation is assisted by anastomosis. Dr. Haighton made an ingenious experiment with respect to the union of nerves. He divided the par vagum, or eighth pair of nerves, in a dog, on one side, and let the animal live for some time ; he then divided the par vagum on the opposite side, and after suffering both nerves to unite, he then divided them at the same time, when the animal died.

In “*tic douloureux*,” after the operation of dividing the nerve, even when the sensibility of the part to which the nerve was distributed is not entirely restored, and although numbness still remains in the cheek, the painful sensation still returns. An old gentleman from the neighbourhood of Bury, in Suffolk, had undergone the operation of the division of the nerve for “*tic douloureux*” several times. When he came last to me, there was still a numbness remaining in the lip, yet the pain of the “*tic douloureux*” was as great as ever. I divided the nerve, but the operation did not afford him the same relief as before. He came again some months after, and wished the nerve to be again divided. The pain in the part had returned to its former degree, although the numbness of the lip was much greater than before.

Parts not reproduced.—The parts of the body which are not reproduced, are, First, muscles. In the case of a man, who had a scar in the fore-arm, which appeared to have long existed, I found, instead of muscular fibre under it, the tendinous structure I now show you. A muscle when divided united by tendon in this case, and not by muscle. Secondly, the cartilages of the ribs unite by bone, and not by cartilage. Here is a specimen of cartilage of the human ribs which had been divided, and in which ossific union had taken place. This, however, will depend, in some measure, on the age of the person ; for in very young subjects cartilaginous union will be produced, but in persons more advanced in years, the cartilages of the ribs unite by bone.

LECTURE VIII.

ON ULCERS.

IN treating of this subject, I shall first describe the appearance of ulcers in what may be termed their healthy state : I shall then detail the several circumstances which render their cure difficult, and proceed to point out to you the various remedies which they require under their different modifications.

Definition.—An ulcer may be defined to be a granulating surface secreting matter. When an ulcer is in a perfectly healthy state, the appearances which it exhibits are as follow : The granulations are of a florid hue : their blood-vessels possess a considerable quantity of arterial blood, and the freedom of circulation produces this florid appearance. The granulations are equal on the surface of the sore, rising a little above the edges ; for it is necessary, in order that the sore should heal kindly, that the surface of the ulcer should be a little more elevated than the surrounding skin. The surface of the sore secretes matter which has a milky appearance, or rather the appearance of cream. The edge is granular, and adapts itself to the surface of the ulcer. In this manner the granulations which spring from the surrounding skin, are well approximated with the circumference of the sore, so that the granulations on the surrounding edge unite with those on the surface. When, therefore, the surface of an ulcer is red, the granulations equal, rising a little above the edge, surrounded by a discharge of healthy matter, and the edge of the sore is nicely adapted to the surface, you will say that such an ulcer is in a healthy state. In order to produce this state of the sore, the best practice which you can generally pursue is, to apply poultices and plasters.

Principles of Treatment.—When an abscess is opened, or a wound is produced which cannot be healed by the adhesive process, the best application for the purpose of exciting the growth of granulations, is a poultice. This poultice must not be too warm ; as it is, by its gentle warmth and moisture, to encourage such a degree of action, as may promote the growth of the granulations, and form a soft bed into which they may spring. When the granulations have risen to the edge of the sore, this practice must be altered ; and it becomes our object to adapt the granulations of the edge to those of the surface. For this purpose adhesive plaster, or unctuous substances, are employed, with a view of pressing down the granulations of the edge of the sore on those of the surface, so as to make them unite. These are the means to be adopted in the cure of ulcers. We first encourage the growth of granulations by the application of poultices ; and when the

granulations have risen to the edge of the surrounding skin, we press down the granulations of the edge on those of the surface.

Such are the principles of treatment applicable to ulcers in the healthy state. We will now proceed to consider the impediments which frequently occur to the healing process, and which render a different mode of treatment necessary.

Impediments to the Healing Process.—The first circumstance which renders the cure of ulcers difficult, is the *too prominent state of the granulations*, producing, what is vulgarly called, proud flesh. In this state, the granulations rising considerably above the edge of the surrounding skin, are necessarily prevented from uniting with those of the edge. In order to prevent the continuance of this state of the sore, the common treatment is, to apply dry lint to the centre of the ulcer, and some unctuous substance to the edges. The lint, by its pressure, prevents the growth of granulations in the centre, while the unctuous substance allows the granulations on the edge to proceed, and inosculate with those on the surface of the sore. The lint should not be applied to the edge; for if it be, the granulations will be prevented from proceeding towards its centre. The nitrate of silver, and the sulphate of copper, are employed for the purpose of destroying luxuriant granulations near the edges of the ulcer. Lint is, therefore, applied to the centre of the sore, for the purpose of keeping down the granulations on the surface; whereas the caustic is applied on its circumference, to check the too rapid growth of the granulations which are nearest the edge of the sore. Thus the healing of the sore is promoted, and a little circle is formed by the caustic from day to day, until it arrive at the centre.

Adhesive plaster is also used to press down the granulations. The common adhesive plaster is, however, too stimulating for this purpose; a plaster composed of equal parts of the emplastrum thuris compositum and the emplastrum saponis, is a much better plaster to promote the healing of ulcers, than the common adhesive plaster. This is a point deserving attention; because if the application is of so stimulating a nature as to excite inflammation, and excoriate the skin, we are often under the necessity of abandoning its use. It sometimes happens, that the action is so great as to oblige us to apply a sheet of lead to the surface of the sore; when this is necessary, you may apply, first, a piece of lint covered with the ceratum cetacei, over this a piece of sheet lead, which should be confined by a roller. These are the various modes of treatment in this state of the sore.

Granulations languid.—The next circumstance to which we shall advert, as giving rise to difficulty in the treatment of ulcers, is a *languid state of the sore*, in which its action is deficient. What is the character of such a sore? You may know that it is in this state, by the glassy and semi-transparent appearance of the granulations; instead of the florid hue which characterises granulations in their healthy state, a considerable portion of them is bloodless. The fact is, that the

heart and vessels of the surrounding parts have not sufficient power to throw the blood to the surface of the granulations.

To remove this buffy appearance, and produce a healthy state of the sore, the application most commonly used is the unguentum hydrargyri nitrico oxidi. This is a strong stimulating application, which occasions a determination of blood to the part, and produces a florid redness in the granulations, instead of the semi-transparent appearance which they assume in the languid state of the sore. It produces, however, a white appearance in the edge of the sore, arising from the thickened state of the cuticle, which prevents the growth of the granulations on the edge. This may be corrected by the application of the unguentum hydrargyri fortius to the edge of the ulcer.

Lotions are frequently applied with the view of stimulating these languid sores; such as the sulphate of zinc, in the proportion of two grains to one ounce of water; or the sulphate of copper, in the proportion of one grain to an ounce. The oxymuriate of mercury and the liquor calcis are also used, for the same purpose, in the proportion of one grain to an ounce. In addition to these applications, it will be necessary to bind up the sore with a roller, and to allow the patient to take exercise, to produce action, and to excite a healing disposition in the sore.*

It will be highly useful in these cases to employ some stimulating plaster, such as emplastrum galbani compositum, for the adhesive plaster will not always answer the purpose, when sores are languid, and the object is to increase the action in the part: this will also be greatly assisted by giving the patient a nutritious diet, allowing him, at the same time, to take exercise; and, in fact, doing every thing to improve the constitution.

The inflamed Ulcer we shall next describe. When the surgeon goes round the hospital on the first day after the admission, he will meet with a number of persons with inflamed ulcers on their legs; and what is the character of these sores? There is a discharge from these wounds, composed of serum, and the red particles of the blood, with a disposition in many cases to slough; the surface is covered with a brown incrustation, and the skin and surrounding parts are highly inflamed.

You will find that the same treatment, which is applicable to inflam-

* I have a great objection to the application of ointments to ulcerated surfaces, and scarcely ever employ them, for the following reasons. In many cases the grease of ointment creates irritation, which is proved by the good effects resulting from the application of a lotion, possessing the same medicinal properties, as an ointment which has previously caused irritation. When an ulcer is deep or irregular, it is difficult to place a dressing of ointment in contact with its whole surface, consequently it only acts partially, and besides, by adhering to the edges of the wound, and the surrounding parts, much time is necessarily required at each dressing to remove it.

Lotions will effect every thing that can be done by ointments in these cases; they have the advantage of being readily applied to the whole surface, and are more cleanly.—T.

mation in general, will be of service in these ulcers, where inflammation has existed for a long time to a high degree. Rest must be enjoined ; and the patient must be kept in bed, in the recumbent posture. Fomentations and poultices should be employed ; fomentations will tend to produce a secretion from the part, and poultices to promote the growth of granulations. With these applications the vessels begin to shoot, the sore assumes a better aspect, healthy secretions are thrown out, and granulations form, fibrous matter is deposited, and in a little time you will have the skin cover the wound. Fomentation, poultices, rest, and the recumbent posture, must be enjoined, and the patient be freely purged ; the best cathartic that you can administer is calomel and compound extract of colocynth, and a draught of the infusion of senna and sulphate of magnesia on the following morning ; by this plan you will do more to subdue the inflammation, than by any other that I know.

If the part in the neighbourhood be much inflamed, leeches had better be applied near the circumference of the ulcer ; with this treatment, in a few days granulations will spring up, pus will be secreted, and the surrounding edges will assume a healthy appearance. Without, however, attending to the constitutional treatment, all your local applications will be of little avail.

Of Gangrenous Ulcers.—This kind of ulcer is very frequent in a man who has been in poverty and distress for a long time, walking the streets of London, looking for an asylum where he may rest his head : this person, at last, comes to a hospital, in a reduced and emaciated state, with a gangrenous ulcer. When you see a wound of this description, you will know it by the surface being free from discharge, the surrounding edges of a livid appearance, with small vesicles or blistered spots on them, and the patient suffers much from irritative fever ; seeing this state of the wound, you enjoin the patient the recumbent posture, which is essentially necessary to promote separation of the dead parts.

The principle of treatment in these cases is, to produce a very slight increase of action in the part ; previously, when the action is excessive, you must, on the contrary, sooth and tranquilize ; both will be, therefore, good in different stages. When there is debility, slight stimulus should be employed ; but when there is excessive action, stimulus must be avoided.

The best application to produce a slight stimulus, and check gangrene, is the nitric acid ; there is none equal to this ; fifty drops of it to a quart of distilled water will be found a most useful remedy, the acid may be increased to a drachm ; this may be done or not as it gives pain, but generally the average strength is fifty drops. I have seen, in a short time after this application, a quick separation of the parts from sloughing, to which there is always a tendency ; and healthy granulations spring up, being, as the chemists would call them, highly oxygenated. The granulations are of a beautiful florid red.

Oiled silk should be applied to the wound, to prevent evaporation, and preserve the moisture of the linen for many hours. An advantage, though a slight one, compared with the others, in the use of nitric acid is, that the offensive smell is nearly removed by it. Another very good application to sores of this kind is nitre, in the proportion of one drachm to a pint of water ; this agrees very well with the sore, and has the same effect with the nitric acid, though in a diminished degree. Sulphuric acid is of use also in these cases, six drops of the acid to four ounces of water ; the muriatic acid has not the same effect as the other mineral acids. If nitric acid be applied to the wound, the granulations will assume a red and healthy look ; if the sulphuric, they will have nearly the same appearance ; but if the muriatic acid be put to the wound, it will have a comparatively slight effect on the granulations, and therefore it is an inferior remedy in the treatment of ulcers. Port wine, porter, dregs of beer, and yest, made into a poultice, are also useful.

You must have recourse to a great variety of applications ; for after you have tried one, which at the beginning was useful, you will, from the wound becoming accustomed to its stimulus, be obliged to change it for another. There is, at this time, a girl in the other hospital, with sloughing of the pudendum ; a variety of means have been used, each of which, at the outset, relieved her a little, but did not continue to do her good for any length of time, and she will, most probably, in the end, fall a victim to the disease ; it is upon this account that I mention so many remedies. The carrot poultice is also a very good application. The constitution of the patient must be attended to, or the local means will do very little ; therefore, local applications must be aided by constitutional remedies, and the best medicine that you can administer is opium with ammonia—twenty drops of tincture of opium three times a day, with ten grains of the carbonate of ammonia in an ounce and a half of camphor mixture, and a little of the compound tincture of cardamom.

This is the medicine which will agree best with the patient ; he must be well nourished, or at least he must have as much as his digestive powers will bear ; port wine must also be given, and spirits may be allowed to those who have been addicted to their use : by brandy and opium I have seen these sores cured ; in fact, they are our sheet anchors in the treatment of these ulcers. But I shall have to speak of this again in the Lecture on Gangrene.

Irritable Ulcer.—The next kind of ulcer is the *irritable*. This sore is extremely difficult of cure. How are you to know it ? When you find the granulations most unequal ; in some parts being very high, in others depressed. The discharge from the wound consisting of a bloody pus, which is pus mixed with the red particles of the blood. This sore, then, may be known by the inequality of the granulations, the nature of the discharge, and the great pain and tenderness in the part ; so that the patient is like a sensitive plant, shrinking from the slightest touch. As you will find considerable difficulty in

the treatment of these sores, I will tell you the best application that you can use : a compound of cetaceous ointment, mercurial ointment, and powdered opium, agrees well.

R. Unguent: cetacei.
 Unguent: hydrarg: mit: aa $\frac{3}{4}$ ss.
 Pulv: opii: $\frac{3}{4}$ j M.
 Fiat unguentum.

This must be spread on lint, and applied to the part twice a day.* The internal remedies you ought to exhibit in these cases are calomel and opium : these are the medicines on which you are to rely : a grain and a half of calomel, and a grain of opium, morning and evening. Nothing will be of so much service as this medicine. It should not be carried so far as to produce ptyalism, or to affect the constitution severely ; but it should be given so as to restore the secretions, and to diminish the excitement of the nervous system. The calomel will do the first, and the opium will lessen the nervous irritability. The treatment of inflammation has been improved of late, by exhibiting calomel and opium. The effect of this medicine in inflammation may be seen in the disease called iritis. Here calomel and opium must be exhibited : nor should a deposit of adhesive matter into the anterior chamber of the eye, be any bar to their use. Give five grains of calomel and a grain of opium night and morning ; and in the space of a week, if the eye has not suffered so much as to be disorganized, this remedy will correct the inflammation, and vision will be restored.

We use other remedies, such as the compound decoction of sarsaparilla. Some think it a placebo; others have a very high opinion of its efficacy. I do not think much of it myself in these cases ; but after the use of mercury it diminishes the irritability of the constitution, and soon soothes the system into peace. With this view, its aid, combined with other remedies, may be here of use. Before I conclude this part of the subject, I will mention a case which just occurs to me; I allude to that of Mr. Lucas, the surgeon of the other Hospital. That gentleman, in consequence of having pricked his finger, had a very irritable sore, which obliged him to go into the country, where he remained for a considerable time. The remedy which he found most

* In these cases I usually employ a lotion, composed of lime water, mucilage, and opium, in preference to the ointment, for reasons I have before mentioned. As a general remedy to irritable ulcers, I can with confidence recommend it strongly, as I have had ample opportunity of witnessing its good effects. It is applied on lint or soft linen to the ulcerated surface ; and a portion of oil silk, or a light poultice, is placed over it, to prevent the lint from drying. In preparing the lotion, the opium must be dissolved in the lime water, and the solution is then to be filtered, to get rid of all extraneous particles, after which the mucilage is added : the proportions are as follow :

R. Liquor. calcis $\frac{1}{2}$ j.
 Extract. opii: $\frac{3}{4}$ j.
 Mucilag. acaciæ $\frac{3}{4}$ ij. M. fiat lot.

efficacious for bringing the sore into a healing state was the application of a solution of nitric acid, very much diluted ; and he took the compound decoction of sarsaparilla. From the latter he thought he derived considerable benefit. By these means, and by attention to his general health, he effected a cure ; but his life was in considerable danger from the irritable sore, produced by an apparently trivial accident.

Sinuous Ulcers.—Whenever a sore extends to any considerable depth, and the discharge has to travel through a channel before it arrives at the surface, such an ulcer is called sinuous. There are two reasons why these ulcerations are difficult to heal : first, from matter forming at its extremity, forcing its way through the passage, and thereby disturbing the healing process, by breaking down whatever adhesions and granulations form on its sides ; and, secondly, the same interruptions occur from the actions of the muscles, when these ulcerations happen in muscular parts ; thus, if the healing process has commenced in fistula in ano, when the sides of the fistula are at rest, the first time that the person has a motion, the sphincter ani, by its action, will destroy the newly-formed union ; consequently, if the sphincter be divided and the parts have rest, granulations will form, remain undisturbed, and a cure be the result ; and this clearly shows that the motions of the sphincter occasion a continuance of the evil.

Sometimes in these cases, to excite the adhesive inflammation, injections of tinctura lyttæ are used ; it readily produces inflammation ; adhesive matter becomes thrown out ; and if you take care to keep the sides of the sinus in contact by these means, the parts will permanently coalesce. Sinuses of the rectum, however, are seldom cured without operation ; indeed, I have met with but two such cases ; one was that of a gentleman who came from the north of England ; he had been annoyed by a fistula on each side of the anus, and one of which was operated upon by Mr. Hey, of Leeds ; he was cured on that side by the operation ; but as it was attended with some loss of blood, the patient was too much frightened to be cut again, and he came to town for advice. I examined him, and finding that there was considerable space between the anus and the fistula, I advised him not to submit to an operation, and said that I would try to relieve by injection. I injected first Port wine and water : this did not answer ; it was not sufficiently powerful. Port wine alone was used, and succeeded in obliterating the canal. I was fortunate in this instance ; for I can assure you, that fistula in ano is seldom, very seldom, completely cured without an operation. When you do not succeed by injection in sinuous sores, you may employ the caustic bougie. Still pressure will be necessary ; and it is scarcely possible that you can succeed without it. When the fistula is very extensive, it may be divided into two ; or a seton may be introduced, and kept in for a fortnight or three weeks, with a view of stimulating the parts, for the purpose of filling the cavity with granulations.

Extraneous Bodies.—Ulcers are frequently formed for the dis-

charge of extraneous bodies ; when such substances become lodged, therefore, in any part of the human frame, inflammation is excited, pus becomes secreted ; which pressing towards the surface, ulceration succeeds, and the extraneous substance is thus afforded an opportunity of escape. Ulcers of very considerable extent arise from the exfoliation of bone ; here you can assist nature by applications which act chemically on the parts ; apply, for this purpose, a lotion composed of muriatic acid and water, or nitric acid and water : this wash will dissolve the phosphate of lime, or earthy matter of the bone, and whilst removing this inanimate substance, the action of the absorbents will be increased, and a quicker separation of the diseased from the healthy parts be the consequence. The acids, however, have not so great an influence in these cases as you might be led to expect ; still, however, you will find them to be of use, and they should be employed.

Irritation from the Nails growing in.—Ulcers, which occasionally form on the fingers and toes, are sometimes exceedingly difficult to heal, from an irritation caused by portions of the nails penetrating the integument. You may think this too trifling a subject to require a moment's consideration ; but I can assure you it is far otherwise. A nail, for example, from pressure or some other cause, shoots into the skin beside it ; a fungus springs up ; the surgeon applies caustic, and destroys it ; in a short time it rises again ; the caustic is repeated, and the fungus disappears ; it speedily, however, returns, and will continue to do so, notwithstanding all his efforts to the contrary, unless he remove the irritating cause ; now this cause is the projecting portion of the nail : as soon as that is removed, or its pressure prevented, the fungus will cease to grow, and the ulcer immediately heal. The best modes to adopt for the purpose of radically relieving these troublesome affections are as follow :—Pare down the nail as thin as you can, without producing bleeding ; then raise its edge a little and introduce between it and the sore a small piece of lint ; in this way the irritation may generally be removed. It sometimes happens, however, that the sore is so exceedingly irritable, that even lint cannot be lodged on its surface without producing great increase of inflammation and pain ; in such cases, what I do is this : with a pair of scissors I slit up the nail on the side where the disease exists, and then, with forceps, turn back, and sometimes completely remove, the divided portion. This is a very painful operation certainly, but I have known persons get well by this treatment in ten days, when the complaint had for months resisted every other. The applications to be used after the operation are of little importance ; poultices are the best, and these will be required but for a limited period ; for the irritating cause having been removed, the fungus will soon disappear.

The next plan to be adopted, for curing these cases, is the application of a blister ; this brings away the cuticle, and often the nail with it. The most lenient method is the one first mentioned, viz., the introduction of a piece of lint. Mr. Hunter, in alluding to this disease, said, that the parts were not in a state of harmony : this is very true, and a

very proper expression ; he also applied it to those cases where a disease in the gland producing the nail, causes the nail to turn black : such affections are not uncommon, and are often thought to be syphilitic, and I have frequently known persons salivated for them ; this opinion, however, is perfectly erroneous ; you must apply to the sore liq : calcis and calomel, and administer the pil : hydr : submur : comp : and decoct : sarsaparillæ comp :

* Sometimes, in these cases, we apply a blister, then remove the nail ; but often we are obliged to dissect out the gland that produces the nail ; and though the operation is a painful one for the patient, yet we are, for the purpose of affording permanent relief, compelled to resort to it.

Whitlow.—Whitlow is an exceedingly painful swelling, terminating in an abscess by the side of the nail. The principle is this : the matter forms at first under the nail ; but being unable to force its way through that horny substance, burrows under it, until it escapes at its edges, thus producing excessive pain and irritation. Fungous excrescences often arise in these cases, which induce the surgeon to apply caustic ; this practice is worse than useless. You should, after fomenting or poulticing the part, remove a portion of nail ; this permits the matter to escape, and instantaneous relief is the result.

Menstrual Ulcer.—The next ulcer that I shall describe is the *menstrual* ; I mean by this a sore, which, once in three weeks or a month, secretes a bloody fluid. This complaint is connected with amenorrhœa. In visiting the hospitals, you must have observed that females on one day have their sores healthy, and probably on the next day they are covered with blood—in fact, the menstrual ulcer is a very common occurrence. You must apply to these sores liq : calcis and calomel ; give the patient the mist : ferri cum myrrhâ and pil : hydr : submur : comp : an ounce and a half of the former, twice or three times a day, and five grains of the latter every night at bed time. These medicines will generally succeed in improving the state of the constitution, by restoring the defective secretions.

Ulcers from Varicose Veins.—The next ulcers which I shall explain to you are the *varicose*, from varicose veins ; and I shall be particular in my description, as the subject is one of importance. The veins, in different parts of the body, often become varicose ; but those of the lower extremities by far the most frequently so. This condition of the vessels arises from extreme distension, so that their sides are separated and their valves are incapable of approximating : the blood pressing in one uninterrupted column, the veins become distended and serpentine, and the valves widely separated from each other ; the heart and arteries, by their powerful attempts to return the blood, soon excite inflammation, and ulceration supervenes. The most common effect produced is, desquamation of the cuticle, the whole surface

* At the root of each nail a gland exists, which secretes the nail ; and under the nail are laminæ, into which the nail grows ; and by corresponding laminæ, in the under surface of the nail, it adheres with extraordinary firmness.

of the skin covering the diseased veins is formed into a crust, and under this a quantity of serum is secreted. The first thing to be attended to in these cases is the recumbent posture : in fact, this position is indispensable ; you can do nothing without it. Lint, wetted by the black mercurial wash, should be laid on the ulcers, oil silk over these, and the limb should be well and regularly bandaged, beginning at the foot. The pressure allows the valves to recover their lost action, and consequently it will be found to be highly useful. Another great benefit is derived in these cases from opening the veins ; indeed, they are so distended that they may more properly be termed lakes than rivulets. If you do not open the vessels, you will find considerable difficulty in the progress of the cure. The best plan that you can adopt is to puncture them by means of a lancet, twice in the week as long as you think they require it ; let the bandage be afterwards applied, and the parts kept wet by means of evaporating lotion. No danger whatever attends the opening of these veins, and very great relief will be afforded by it. If the punctures, however, at any time should not unite, but fret into ulcers, you must apply to them liq : calcis and calomel. It often happens that persons, who, for a length of time, have had the veins of their lower extremities in a varicose state, will find a great quantity of blood in their shoe ; the crust, before alluded to, coming off, is the cause of hæmorrhage, by opening the vein. Upon being called to a patient so situated, you may put him in the recumbent posture, apply a bandage, wet the part constantly with spirit of wine and cold water, and you will prevent any future bleeding.

Pregnancy is a frequent cause of varicose veins, and so is obesity.

It was formerly the practice, when the veins were in a varicose state, to tie and divide them. This plan is still pursued by many surgeons ; but it is one that I have deprecated in my Lectures in this Theatre for the last eight or nine years ; it is very injudicious, and fraught with great danger ; therefore, let me exhort you never to adopt it. I have seen this operation prove fatal in several instances in these Hospitals ; therefore I was induced to say that it must not be performed. A gentleman, at Nottingham, informed me that he had tied the vena saphena, for a varicose state of the veins of the leg of a young farmer, in other respects healthy, and the operation proved fatal. The same lamentable catastrophe occurred to a most respectable practitioner at Brentford ; and this gentleman told me, that he would not again perform the operation for the world. If I were to tell you all the cases in which I have known it terminate fatally, I should recount at least eight. Another overwhelming objection to the operation is, that when it does not prove fatal, its ultimate effects are useless. If I were asked which of the following operations I would rather have performed upon myself, viz., the saphena major vein, or the femoral artery, tied, I certainly should choose the latter. When an artery is tied, the inflammation is confined to the neighbourhood of the ligature ; but in a vein it is very extensive, the vessel becomes exceed-

ingly distended, the inflammation uncommonly severe, and either extensive suppuration or mortification ensue, and death is the result.

Mr. Travers has written an excellent Essay on this subject, which well deserves your attentive perusal.

Chronic Carbuncle.—Ulcers are sometimes occurring in the cellular membrane, which I call *chronic carbuncle*.

When the constitution is impaired, from any cause, it frequently happens that small swellings form under the skin. At first they are red, then turn purple, and ultimately slough. The ulcerative process is slow in these cases. A white substance will soon be perceived at the bottom of the sore, called vulgarly a core; and as soon as this separates, healthy granulations will form, and the wound become healed. Constitutional treatment in these cases is absolutely necessary; for unless you improve the general health, the ulcers will not heal. You should administer aperients, such as the infusion of senna, Epsom salts, &c., and give alteratives; the Plummer's pill will be found the best medicine. For females, where great general debility has given rise to the formation of these sores, no medicine can equal in power the carbonate of ammonia. I shall have frequent occasion to allude to this. I generally give it in the following form:—

R. Ammon: carb: \mathfrak{z} ss.
 Aq: menth: virid: \mathfrak{z} vss.
 Tinct: cardam: comp: \mathfrak{z} ss.
 M. ft. mistura.

If any one medicine improves the nervous system when deranged more than another, it is this. I have often prescribed it for females when in a state of extreme weakness, and its effects are truly astonishing: three table spoonfuls of the mixture may be taken two or three times a day. If the poultices have not the effect of exciting the granulating process, you may wash the sores with the liq: calcis and calomel lotion, or gently touch their surface by means of the nitrate of silver. This state of the cellular membrane often accompanies amenorrhœa, and then the mistur: myrrhæ c. ferro, and the pil: hydrarg: submur: comp: are the best medicines.*

Cutaneous Ulcers.—It not unfrequently happens, that the skin in various parts of the body falls into a state of superficial ulceration, producing *cutaneous ulcers*. The best applications in these cases are, the yellow wash: ungt: hydr: nit: or the ungt: zinci oxydi. The internal use of the oxymuriate of mercury will likewise be found particularly beneficial and salutary; give it in the formula mentioned in a previous lecture, viz., in conjunction with tincture of bark; a small quantity of this mixture should be taken in a little white wine, once or twice daily, according to the age and symptoms. This medi-

* The cure in these cases is much expedited by making a free incision through the swelling; as it allows the core, or dead cellular substance, to escape, without which the ulcer cannot be healed.—T.

cine will be found a very valuable one, when the above-mentioned ulcerations are connected with disease of the glandular system.

Noli me tangere.—There is an ulcer often existing on the face, called *noli me tangere*. This disease has never been correctly described; the truth is, that it is an ulceration of the glands, or follicles of the nose, those small cavities from which you can squeeze sebaceous matter; the ulceration extending deeply, at last even the cartilages of the nose become destroyed. The plan of treatment to be pursued in this case, is as follows: you must prepare an ointment, according to the following prescription:

R. Arsenic oxyd.
Sulphus flor aa ʒ j
Ungt. cetacei ʒ j
M. fiat unguentum.

Apply some of this ointment on lint, to the ulcer, and leave it there for twenty-four hours; and then remove it, a slough will separate: dress the ulcer with some simple ointment, or a poultice, and in a short time it will generally heal. If the ulcer is not deep, you may cure this complaint without using the arsenical preparation, by painting the surface of the sore daily with a solution of the nitrate of silver.

You must be cautious, however, in your manner of using this application. A gentleman once came to me with an ulcer of the kind of which I am speaking, and which I painted in the manner described, with a camel's hair brush. In the course of the day, when at Lloyd's, he was asked by some friends what was the matter with his nose, for they told him it was quite black; and, in fact, it was so. I was not aware, at the time, that a solution of the nitrate of silver would have produced that effect: and I merely mention the circumstance, that you may be on your guard. The nitric acid is a good application, diluted according to the irritability of the part, and the liq: calcis c. hydrarg: oxymuriat: produces a good effect.

Deep ulcers, having a malignant aspect, often remain in the face of old persons, without destroying life, although, from their appearance, they portend the most direful effects. To such sores the best application is, the arsenical ointment.

In gouty habits ulcers frequently form on joints, arising from inflammation caused by a deposition of the urate of soda. Persons sometimes apply with many joints open from this cause. A gentleman came to me from the country thus circumstanced: several of the joints of the toes were quite exposed, and the cartilages of some of them absorbed. I found in each of these joints a portion of the urate of soda; therefore, when it is necessary, to increase the openings through the skin, and remove the urate of soda, that being the exciting cause of the disease. It is curious how little irritation is produced in the parts when thus affected, for this gentleman walked to my house.

Ulcers with thickened Edges.—Occasionally the *thickened state of the edges of ulcers* impedes the healing process. These edges must

be adapted to their surfaces, and this may be done by means of the empl : galban : comp : which will remove the indurated cuticle, and stimulate the parts to action ; if this, however, should not succeed, you may use the ungt : hydr : fort : or ungt : lyttæ, or you may with a lancet scarify the edges, and this method will often succeed, when every other fails. A blister has an excellent effect.

Ulcers with inverted Edges.—The edges of sores are sometimes very much inverted : a constitutional, as well as local treatment is then necessary. With respect to the local, the application of nitrate of silver to the edges, and the black mercurial wash to the surface of the wound, is generally all that will be required, and the alterative medicines I have so often mentioned to you must be regularly given until the ulcer heals.

With everted Edges.—Some sores have their edges very much everted, and this affection is commonly symptomatic of a malignant diathesis. The usual method of treatment practised in these hospitals is, to poultice such ulcers ; to attend particularly to the condition of the general health, until it is possible the edges have resumed a natural and healthy state.

Thus have I passed over in review the various modes of treatment required for sores in different states ; but when it is a simple ulcer only, the admirable mode recommended by Mr. Baynton, of applying straps of adhesive plaster, should be had recourse to ; which, by stimulating the surface, approximating the sides of the wound, and thus facilitating the processes of granulation and cicatrization, surprisingly contributes to complete the healing process.

LECTURE IX.

ON GANGRENE.

HAVING traced inflammation through its adhesive, suppurative, and ulcerative stages, I shall now proceed to consider it in its most destructive form ; namely, when it exists in such excess as to produce gangrene.

We find that when inflammation is extremely violent, it occasions the destruction of the vital power of the part. At other times, when there is a less degree of inflammatory action, but the powers of the part are feeble, life will still be destroyed ; so that gangrene is produced either by an excess of inflammatory action, where the powers are natural, or by a less degree of inflammation, where the powers of the part are feeble.

Definition.—Gangrene may be considered as a partial death : this

is its definition : the death of one part of the body, while the other parts retain their natural powers.

Symptoms of Gangrene.—The symptoms of gangrene differ according to the manner in which it is produced. When it is the result of high and active inflammation, the pain attending its production is exceedingly severe ; the inflammation is very extensive ; there is a blush on the surrounding skin ; and generally, though not always, a considerable degree of swelling. The secretion from any sore which may exist ceases, the surface of the skin becomes of a purple colour prior to its death, but afterwards is rather of a brownish tinge. The cuticle is raised ; a vesication is produced ; and when this breaks, it is found to contain a bloody serum. When the serum is discharged, the skin assumes the gangrenous appearance, and becomes perfectly insensible. The vesications extend to parts beyond the ulceration : thus in sores of the leg we frequently see a large portion of the skin giving way, and the gangrenous vesications extending beyond the ulcerated surface.

Constitutional Symptoms.—The constitution suffers considerable derangement from gangrene ; there is a high degree of irritative fever, and the pulse is often extremely quick : it is generally said to become slow when gangrene takes place ; but I have never observed this. I have indeed occasionally remarked but a few beats in a minute, because it is very frequently intermittent ; still the pulse is quick : it is said also to become soft ; but I should not say that this is the character of the pulse in gangrene. It is quick, very small and thready, and generally irregular.

Delirium and Hiccough.—Gangrene seldom occurs without delirium, and it is attended also with vomiting and hiccough. Hiccough, indeed, is the characteristic sign of gangrene, and it takes place though the gangrene may be situated in a part very distant from the stomach ; as, for example, in the toe. The fact is, that when gangrene arises from a diseased state of the constitution, the stomach is extremely disordered, and its derangement is followed by spasmodic contraction of the diaphragm, producing hiccough. This symptom does not arise from any direct action on the diaphragm, but from its sympathy with the deranged state of the stomach. If you wish to correct hiccough, you may arrest it for a time by giving some slight stimulus, or even by adopting opposite means. Thus a glass of cold water will suspend it for a considerable period. Such are the symptoms when gangrene is the result of excessive action.

Gangrene from Feeble Action.—Gangrene is sometimes the effect of a low degree of inflammation ; as when it is produced by the application of cold. If a great degree of cold is applied to any part for a considerable time, the part will become benumbed ; that is, its nervous power will be diminished ; and when it is thus enfeebled, it will be enabled to bear a very slight degree of supervening inflammation, and the destruction of its life will follow. In this climate, however, destruction of the life of the part does not, in general, immediately

succeed. A person will come to the hospitals with his feet benumbed; he may have been wandering about the streets, unable to find a place of refuge, exposed to severe cold. Great care must be taken in these cases not to apply heat very suddenly; even the common heat of the bed frequently occasions inflammation, which is extremely liable to gangrene, in consequence of the diminished nervous influence of the part. I knew a gentleman of the first consequence in this country, whose death occasioned, perhaps, as much regret as that of any one who has died for many years, who lost his life from an act of imprudence. He had been shooting, and had exposed himself to severe cold; and finding his feet benumbed on his return, he immediately put them into warm water. The consequence was, that a gangrene took place, of which, notwithstanding every care, he died. In this climate it generally happens, that inflammation succeeds the application of cold after an interval of two or three days. By the use of some slight means of treatment, this inflammation is generally suspended; and it is by the repetition of the inflammation, rather than by its severity, that the powers of the part become, at last, exhausted. In colder climates than our own, that part exposed to cold becomes white, and the suspended circulation is commonly restored, by rubbing the part with snow. If it be not very carefully treated, however, inflammation and sloughing are apt to ensue. If a part be completely frozen, inflammation frequently ensues in a short time, and after continuing for a few hours, is followed by a destruction of the vital power.

These are symptoms which we observe in cases where gangrene is the result, either of a high degree of inflammatory action, or of diminished powers. When gangrene is produced by either of these causes, the process of separation soon commences; this is one of the most curious which occurs in the human body. There is nothing more extraordinary to my mind than the power which nature possesses of separating even large members without any hæmorrhage, and with little danger to life. There is an instance at the present time, in the other hospital, in a case of popliteal aneurism, which will afford you an opportunity of judging of this process of separation for yourselves.*

Separation of the Skin.—The first appearance which we observe after the destruction of the life of any part, is a white line which nature forms for the separation of the dead from the living parts; for this white line we anxiously look, since it is the barrier which nature sets up between the dead and living parts, and it becomes a criterion of the cessation of the gangrenous disposition. At this white line the cuticle is raised. This elevation of the cuticle is, a vesication which forms a line of circumvallation around the gangrene. When the cuticle becomes separated, as it will in two or three days, we find a chasm beneath it produced by the absorption of the living skin, which was in contact with the dead. The living skin is taken up by the absorbent

* This man's leg has separated through the calf.

vessels into the constitution, and in this manner the dead parts are separated by a process of nature. If we were to reason, *à priori*, on this subject, it might be expected, that the absorbent vessels would rather remove the dead portion of skin in contact with the living ; but this is not the case. The absorbent vessels act on the living parts, and not on the dead ; nor is the dead skin absorbed after the granulations have formed, but it becomes loose, and ceases to attach itself to the surrounding parts ; the chasm formed by the absorbent vessels causing separation.

Separation of Cellular Tissue.—The next part which begins to separate is, the cellular tissue immediately under the skin. Gangrene proceeds to a much greater extent in the cellular tissue than in the surrounding skin, because the cellular membrane is a part of weaker living powers. It is for this reason that a sloughing disposition is so dangerous in sores extending to the cellular membrane. A small chancre beginning in the pudendum of the female, or in the prepuce of the male, will frequently occasion the destruction of life in the part. Persons have absurdly supposed, that these sloughing sores are not chancres, because they have not the common venereal character. How does this happen ? if a chancre form in the pudendum of an irritable female, and has a sloughing disposition, it extends into the cellular tissue, inflames it to a high degree, and produces gangrene. In this manner the character of the chancre becomes destroyed. There is, at this time, an unfortunate female (only seventeen years of age) in the other hospital, who has lost a considerable portion of the external organs of generation, in consequence of a sloughing chancre. The hospitals teem with such cases ; and indeed this deplorable result is frequent when a chancre extends into the cellular tissue, a part naturally weak, and rendered weaker in these persons from their irritability and mode of life.

Separation of Muscles.—The next part that separates is, muscle. Muscles separate nearly opposite the edge of the skin. Wherever the skin separates, the muscle gives way ; a line of separation is formed, and the living portion of muscle is removed from the dead. This is not the case with tendons ; these, like the cellular tissue, do not separate opposite the skin, but at a considerable distance from the part at which the sloughing happens. If a tendon be exposed in the palm of the hand, by a sloughing ulcer, it separates near the wrist ; for it is incapable of resisting the inflammation, in consequence of its weak living powers, and separates, therefore, at the part where it joins the muscle.

Separation of Nerves.—The nerves separate, like muscles, opposite the skin ; but the most extraordinary instance of the process of separation is, that which takes place in the larger blood-vessels. What would be the result, if the anterior and posterior tibial arteries were cut, without placing a tourniquet on the limb ? the person would die in a few minutes. Yet nature frequently divides the arteries I have mentioned, without any blood issuing from the limb. This hap-

pens in the following manner : The blood in the vessels of the dead part becomes coagulated ; the coagulum, however, does not confine itself to the dead part, but extends to the living vessels which join it, and is, in this manner, glued to the inner side of the artery by the adhesive inflammation ; so that the vessels are, as it were, hermetically sealed ; and not a drop of blood can escape by the side of the coagulum. The same thing takes place in veins, the coagulum adhering to the inner side of the living vein, so that no blood can escape. If you amputate a limb at a considerable distance from the part at which gangrene has commenced, you will still find the vessels sealed. The first amputation which I ever performed, was in the case of a person who had a gangrenous ulcer near the head of the tibia. In this case it was necessary to amputate above the knee, as sufficient skin would not have been left if the amputation had been performed below. When I loosened the tourniquet, I was surprised that the femoral artery did not bleed. On a closer examination I found that the inner side of the femoral artery was completely sealed by the coagulum which had extended, at least, six inches above the place at which the gangrene had occurred. It appears, therefore, that the artery is not only sealed at the place at which nature divides it, but at a considerable distance above it, in order to provide against the danger which would arise from a separation of the coagulum.

Separation of Bones.—Bones, at last, become separated ; but this process is very slow, loaded as they are with phosphate of lime. Hence we are often under the necessity of taking away bones, when the process of separation is, in other respects, complete. I am anxious, whenever I have an opportunity in these lectures, to refer you to cases actually existing in the hospitals ; and you cannot have a better opportunity of observing the process of nature with respect to the separation of bones, than in the case of popliteal aneurism, to which I have before directed your attention. This man underwent the operation for aneurism in the other hospital. The aneurismal bag had been loaded with fluid blood for a length of time ; the process of gangrene commenced at the ankle, all the soft parts were absorbed, and there is nothing now remaining but a portion of bone, which will also separate, if we permit it to do so, by the efforts of nature alone. I knew a person in the country from which I came (Norfolk) whose leg entirely separated by the process of ulceration. In the foot this very commonly takes place ; in the calf of the leg it is not common, but below the calf it frequently occurs. I attended one of the King's messengers some time ago, who came from Germany with a gangrene in the foot. The foot separated at the tarsus, and the whole process went on without any surgical operation, and nothing but the aid of the simplest applications.

Gangrene the effect of Debility.—Gangrene is frequently the effect of a debilitated state of the constitution. Thus if a man has been confined by long continued fever, the nates are apt to slough, and become gangrenous, in consequence of the imperfect circulation, arising

from the position in which he has been forced to remain. Some fevers have a greater tendency than others to produce gangrene ; as, for example, scarlatina.

In slight cases of scarlatina, the most horrible effects will sometimes arise from gangrene. The tonsils slough to a great extent ; parts of the eustachian tube, and even of the tympanum, will separate, and large portions of bone exfoliate. The worst effects of this kind are observed in those cases of scarlatina, in which the fever is not the most violent. The measles are very apt to be followed by sloughing. In this town it sometimes happens, that a large blister applied to the chest of a child labouring under measles occasions a high degree of inflammation, producing gangrene, and endangering the life of the patient. In constitutions of an unfavourable kind, I have seen the measles produce a slough, forming an aperture through the cheek of the child, by which its food escaped, and life was soon destroyed. Mercury, if used to excess, often excites sloughing, from the fever, and consequent debility of the constitution, which it produces. Whatever, in short, weakens the constitution much, disposes it to the production of gangrene ; for the body, when thus debilitated, cannot bear any excess of action.

When the application of cold is the cause of gangrene, the effects are produced very much in the same way. The powers of the part, to which the cold is applied, are diminished, and this diminution of power leads to the destruction of the part, under the first excess of action.

There are also some parts of the body naturally constituted feebly : as, for example, tendons. When inflammation attacks a tendinous structure, it runs very readily into a state of gangrene. Hence the danger of making incisions into tendons ; the inflammation which follows affects the nervous system with the highest degree of irritability, and produces tetanic symptoms. It is not the injury to the nerves which produces tetanus, but sympathy with the injury to the tendon.

It may be stated, as a general principle, that inflammation is the cause of gangrene. Gangrene very rarely happens without inflammation ; but as there are some exceptions to this general principle, I will mention them.

Gangrene not the result of Inflammation.—I have seen, in a case of hydrothorax, a small spot on the leg become at once black, without any appearance of inflammation, and extend itself until it occupied a very large surface. Here the total absence of circulation, and not an increased degree of it, occasioned the destruction of life in the part. So we now and then see aneurism producing gangrene. In the case of popliteal aneurism, to which I before adverted, the gangrene is produced, not by the bursting of the aneurismal bag, but by its pressure on the vessels, occasioning the destruction of life in the limb below. I saw a gentleman, a few months ago, who appeared upon the point of death from the pressure of a popliteal aneurism. His foot afterwards became gangrenous. He did not die, however ; for a separation of the foot, and part of the leg, followed, and he ultimately recovered.

Thus it appears that impeded circulation, without inflammation, is sometimes a cause of gangrene. The division of a considerable blood-vessel will produce the same effect. A person was stabbed in the groin by a foreigner, with a dirk or sharp knife, which penetrated the femoral artery ; considerable hæmorrhage took place, which was stopped by a ligature on the artery ; but the leg afterwards became gangrenous, and it was necessary to amputate the limb.

Since I commenced these Lectures, I have seen a most melancholy instance of a gentleman, in the prime of life, who died from gangrene, in consequence of an injury to the femoral artery. This gentleman was thrown from a gig as he was going down a hill, and the wheel of the carriage went over his thigh. When he was taken up, it was found that he had a simple fracture of the femur. Every thing which attention and skill could do for him was done ; but some peculiarities were observed at the time of the accident. The lower part of the leg was quite insensible ; it was considerably swollen, and hard. After lying in bed for a week, the patient became so restless that he wished to be removed. This was done in the gentlest possible manner. He did not, however, experience the relief which he expected from a change of position, and the swelling was in some degree increased. I was then sent for ; and when I saw him was surprised to find that gangrene had already commenced at the knee. This was hardly to be expected from a simple fracture ; for it so rarely happens that the femoral artery is injured by a fracture of the thigh bone, that amidst all the cases of fractured femur which I have seen, I never witnessed one in which the artery was injured. However, from the immediate insensibility of the limb at the time of the accident, from its coldness, from the swelling which accompanied it, and also from the pulsation which existed opposite to the fracture, I was led to believe that the femoral artery was torn through. The question then arose whether we should amputate. Upon examination, I found the limb emphysematous ; the air had extended into the cellular tissue up the thigh to the abdomen, and putrefaction had already commenced. I perceived, therefore, that the patient had but a few hours to live, and that it was useless to put him to the pain of an operation. Upon examination after death, by the medical gentleman at Rochester, where the patient resided, it was ascertained that the femoral artery was divided. It seems extraordinary, when we contemplate the situation of the thigh bone, with respect to the artery, that a fracture of it should not in one case in ten produce a similar result. A little knowledge of anatomy, however, explains this circumstance. The artery is enclosed in a sheath, which so far protects it ; and its elasticity yielding to the pressure of the bone, enables it to escape in a great majority of cases from being injured by this accident.

Nature of Gangrene.—The nature of gangrene, as far as dissection enables me to judge of it, is this : the excessive action of the part kills the blood-vessels, and the blood contained in dead vessels becomes coagulated.

This is a curious circumstance, which I ascertained by an experiment made on an animal. It is a well known fact in physiology, that if a quantity of blood be included in a living vessel between two ligatures, at the distance of two or three inches, this blood remains rather more than three hours before it becomes coagulated. To ascertain, whether, if blood were admitted into a dead vessel, from which the air was entirely excluded, it would coagulate, as it would out of the body, I put a ligature on the jugular vein of a dog, and another ligature at a distance of two inches from the first ; then cutting through the vein, I brought it externally to the skin, so that it hung out from the wound for six hours. Having ascertained that the blood coagulates in three hours and a quarter, in a living vessel, I took off one ligature from the dead pendulous vessel, and found that in ten minutes the blood had coagulated as firmly as it would in a cup into which a person had been bled. In a dead blood-vessel, therefore, the blood becomes coagulated as it would in a vessel out of the body. If you attempt to inject a part after gangrene, the injection will not enter the vessels. There is a specimen on the table of a gangrenous limb, where you may perceive that the injection has entered only as far as the part at which gangrene has commenced. Such is the state of parts under gangrene. They can never be recovered, because blood cannot again circulate in their vessels.

TREATMENT OF GANGRENE.

We shall now proceed to consider the treatment which is to be employed to prevent gangrene, and to assist the sloughing process.

Local Bleeding.—You must endeavour to soothe the inflamed parts by the application of leeches, with a view of checking the excess of action. It generally happens, in these cases, that the body will not bear any considerable degree of depletion ; but local evacuations, by leeches, may be safely resorted to. Thus, in compound fracture of the leg, gangrene may be prevented by the application of leeches, when it would not be equally safe to take blood from the arm. Soothing applications, such as poppy fomentations, and poppy poultices, should be applied to subdue the excessive action, which threatens destruction to the life of the part. It will be necessary, at the same time, to attend to the constitutional treatment of the patient. In this metropolis it is seldom safe to take blood from the arm to prevent gangrene. In the country, a different practice may be pursued ; and it will frequently be necessary to take away blood in erysipelas, and other cases, in which we cannot and dare not deplete in London, the constitution of the patient being broken by intemperance, or enfeebled by impure atmosphere. When you take away blood, however, to prevent mortification, do not remove more than eight or ten ounces, lest the vigour of the circulation, and consequently the nervous powers of the constitution, should be too much diminished.

Constitutional Remedies.—Two or three grains of submuriate of mercury should be given at night, with a view of restoring the defective secretions of the intestinal canal and the liver : and the liquor ammoniæ acetatis, with a few drops of the tincture of opium, should be given several times in the day. By the calomel you restore the secretions ; and by the opium you tranquilize the system, and diminish the irritability which leads to the destruction of the life of the parts. Do not begin by stimulating the constitution too much in cases of gangrene. The effect of opium may, in some respects, be similar to that of taking a stimulus into the system ; but it is by diminishing the quickness of action, and thus increasing the strength of the body, that opium becomes so valuable a medicine in these cases. The best means, therefore, of preventing gangrene, are to restore the secretions ; to diminish irritability by opium ; and, in some cases, to take away very small quantities of blood.

Treatment of Benumbed or Frozen Parts.—If the gangrene arise from the application of cold, the treatment must be different. In these cases, the action of the parts is feeble from the diminution of nervous power, and it will be proper to restore it to a healthy state by stimulants of the most gentle kind. The principle in this case is, to stimulate gently, but to moderate the stimulus by evaporation.

For this purpose the best application is the camphorated spirit of wine, accompanied by gentle friction. If you are called to a patient whose feet are benumbed by the application of cold, you must sit by his bed side, pour the camphorated spirit into your hand, and rub it on his feet with the utmost possible gentleness, so that the part may not be irritated by violent friction. When the first effects of cold are removed, it will be proper to apply poultices to the part. The poultices must be cold, for warm applications are to be carefully avoided. One of the most valuable of our nobility died of gangrene from an imprudence in this respect. He was out shooting in December last, and his feet having become benumbed, he put them into warm water as soon as he returned home. The consequence was, that his toe became gangrenous ; gangrene also occurred in the other foot, and he died from its effects. When parts are frost-bitten in colder climates, you are aware that the common practice is to restore the circulation by rubbing them with snow. The friction is a stimulus, which the melting snow moderates.

Treatment when Gangrene has commenced.—But so soon as gangrene has commenced, it will be necessary to apply a gentle stimulus, with a view of supporting the action of the surrounding parts which are threatened with the destruction of life. The application which is found to be most uniformly successful in such cases, is the poultice of stale beer grounds mixed with oatmeal ; a poultice, thus formed, will produce a gentle and beneficial stimulus to the part, and prevent the gangrene from spreading to the surrounding skin. Spirituous fomentations are also of use for the same purpose. At the time that this local treatment is employed, means must be taken to support

the constitution, which is debilitated by excessive action. The best mode of producing this effect is by the exhibition of ammonia united with opium. Seven to ten grains of the carbonate of ammonia with twenty drops or half a drachm of the tincture of opium, should be taken two or three times a day, or even every four hours. This plan will generally prevent the extension of gangrene. Bark was formerly extolled, as possessing great virtue in these cases; but it is doubtful whether it does not do as much harm as good. For the first two or three days the patient's health appears improved by its exhibition; but, after a short time, his stomach becomes loaded and oppressed; it first makes him costive, and then purges; and after a little time we are obliged to suspend its use. I am much disposed to try, in these cases, the new form of that medicine, which agrees so well with the stomach; I allude to the sulphate of quinine. It is my intention to give it a full trial in the first case of gangrene which I meet with; and I recommend you to try it yourselves in those cases which may come under your observation. An excellent medicine used in the other Hospital, is a bolus, of five grains of the carbonate of ammonia with ten grains of musk, given every four hours. I have seen this medicine produce the best effects in sloughing sores in the foul wards, and in cases in which the gangrene was much disposed to spread. The musk has the effect of keeping up the stimulus of the ammonia, which is apt to subside after a few hours, when the ammonia is exhibited alone. We find that a change in the local remedies is often required. A port wine poultice is an admirable application in these cases. I mentioned to you, a few days ago, the case of a girl, in the other Hospital, who had a gangrenous sore in the pudendum, where a great variety of applications had been tried without any beneficial result. At last a port wine poultice was applied, and with such immediate good effects, that, though I had before despaired of her life, the last time I saw her, the sore was brought into so healthy a state, that there are great hopes of her recovery. Applications of turpentine also are often of use in these cases, for the purpose of stimulating the parts.

After great want of circulation in any part, from the course of the blood having been arrested, sloughing sores are very apt to occur. Thus, after the operation of tying the femoral artery, if the limb be suffered to rest in the same position for a considerable time, a small gangrenous spot frequently appears upon the heel. In such cases, the spirit of turpentine is the best application. Yest is often applied with advantage. An application, much used in Guy's Hospital for this purpose, is the formula which used to be called the *epithema lithargyri acetatis*; but now the *epithema plumbi subacetatis*.

The following is the mode of preparing it:

R. Confect: ros:	℥ j	
Mel rosæ		
Tinc: opii aa		} 3 jj. M.
Liq: plumbi subacet:		

This is an application which accords extremely well with limbs in a

state of gangrene, when the dead are separating from the living parts. During the sloughing process, the nitric acid is upon the whole the best application that can be used : when the gangrene stops, and the line of demarcation is drawn, and the sloughing process is commencing, the nitric acid may be employed in the proportion of fifty drops to a pint of water. I have seen very good effects from an application composed of vinegar and the camphor mixture ; about four ounces of the former to twelve ounces of the latter. This was of service when no other application had succeeded, in the case of a gentleman at Peckham, whom I attended with Mr. Arnould. These are the different modes of treatment for the prevention of gangrene, and to assist the sloughing process.

Propriety of Amputating.—As to the propriety of amputation in these cases, there is sometimes no occasion for amputation in gangrene when the sloughing process is proceeding favourably, as you have an opportunity of seeing, in a man in the other Hospital, in whom nature has performed the operation herself, without any assistance ; if the surgeon will be content to wait a short time, and the patient be so disposed, you will find that the parts will separate without an operation. Nature adopts the very plan in her amputations which the surgeon pursues ; the skin separates the longest, the muscles next, and then the tendons, together with the bones, which are left considerably shorter than the other parts, as you may observe from the specimen on the table ; the bones become covered by the skin, and the muscles surround the extremity of the bone. The cases in which you are required to perform the operation of amputation are those in which the patient is unable to sustain the constitutional derangement produced by the process of separation ; but when the constitution is strong, the patient will bear the process required to separate the limb. You have an opportunity of seeing in the other Hospital at present, in the case to which I have so often alluded, separation taking place above the centre of the leg ; there is no absolute necessity to amputate under such circumstances, and you can give the patient a chance of his life without resorting to it. In constitutional gangrene, as a general principle, do not amputate till the sloughing process has commenced, and healthy granulations are to be seen on the sore ; for, if an operation be performed, the stump will assume the same appearance and become gangrenous. It is curious to see how the loss of a slight quantity of blood will destroy life in these cases. When I was a dresser at these Hospitals, during my apprenticeship, there was a case of sloughing opposite to the calf of the leg ; Mr. Cline, my old master, on going round the wards, said to the dresser, that the projecting ends of the bone had better be removed ; there were some granulations between the bones, which, in sawing, the dresser did not observe, and he cut through them ; a slight hæmorrhage ensued, and in the same night the patient died.—There was a case, in the other Hospital, in which the operation of amputation was performed ; gangrene existed on one foot, a slight gangrene on the nose, and on the other foot : the leg was

amputated ; but the gangrene spread on the nose and foot, which, before the operation, were only slightly affected. Amputation, then, should never be performed till the constitution be in an improved state, and healthy granulations have appeared.

Gangrene from Accident.—But, with respect to gangrene from diminished action, or accident on some important vessel, amputation may be performed without hesitation. A girl was brought to Guy's Hospital, who, in endeavouring to reach something from a chimney-piece, trod on the fender, which turned over and she fell on its edge : a compound dislocation of the elbow-joint, together with a wound of the brachial artery, were produced ; the vessel was tied by the dresser ; hæmorrhage was arrested ; gangrene soon afterwards appeared on the fingers, hand, and fore-arm ; when, nine days from the accident, the operation of amputation was performed above the elbow-joint, and the patient's stump was perfectly healthy. A man was brought to Guy's from Woolwich with popliteal aneurism ; the aneurism had acquired great size ; a gangrenous state of the limb forbade the ligature on the artery, and amputation was performed. Before the operation, the pulse was from a hundred and twenty to a hundred and thirty : in the evening, after the removal of the limb, I sent Mr. Callaway, who was my apprentice at that time, to see how the patient proceeded : he found that the pulse had fallen to ninety ; and no amputation that I ever performed ended more favourably. Under such circumstances, amputation, instead of increasing the irritability of the constitution, by removing the cause of irritation, becomes the means of preserving the life of the patient.

OF GANGRENE IN OLD PERSONS.

Cause of Gangrene.—We often find old persons afflicted with gangrene, from very slight causes ; the action of the heart being naturally weakened by age, the circulation becomes extremely languid in the feet, and mortification of the toes ensues. The appearances which the parts assume are these : at first it is red and painful ; slight pressure empties it of its blood, and some time elapses before it recovers its colour ; the person, little alarmed, puts upon the affected part a piece of linen ; in a few days the part is purple, the cuticle comes off, and there issues from the surface a sanious discharge ; red streaks are now seen passing from different parts of the foot up the leg ; and the glands in the groin often undergo considerable inflammation and enlargement ; many of the absorbent vessels of the foot and leg becoming inflamed, produce universal redness of the diseased member. Soon after this the gangrene begins to extend, involves the whole of the foot, and passes to the lower part of the leg, where it usually stops, as it seldom reaches the thigh ; the constitution becomes considerably influenced ; there is some degree of fever, and the cheeks are of a fixed, florid red. This gangrene does not always destroy life, if attention be

paid to the patient. It often arises from ossification of the arteries, not so much of the large vessels, as of the small. These losing their elasticity, combined with a debilitated action of the heart, give rise to the disease of which I am now speaking. The earthy matter sometimes is deposited in great quantities in large vessels, and here is a preparation where the deposition of earthy substance had rendered the popliteal artery impervious.

Cases.—I recollect some time ago a very intelligent surgeon (Mr. Steele of Barkhampstead) telling me, that he thought a certain nobleman whom he was at that time attending, had ossification of the arteries of the leg, from the pains of which he complained under exercise, and that it would some day give rise to gangrene. Of which his lordship has since died.

Where ossification of the blood-vessels exists, very slight causes will give rise to gangrene. A gentleman of this city, in cutting a toe nail, carried the knife too far, and cut the quick, as it is termed; the wound soon became gangrenous and black, and in the sequel he died. I attended a gentleman, an old surgeon, who, for the purpose of getting rid of a bunion, had (most foolishly) put a lancet into it. Gangrene followed, and he died. I was lately sent for by Mr. Holt, surgeon, of Tottenham, to a gentleman who, when cutting a corn, had carried the incision so deep as to produce bleeding: gangrene succeeded, but this gentleman recovered. Old persons must, therefore, be cautious; for life being almost exhausted, very little will extinguish it.

Treatment.—With regard to its *treatment*, a poultice, composed of port wine and oatmeal, or of stale beer grounds, will be found the best *local* application; and the *internal* remedies should consist of opium, combined with ammonia. You must not expect that these cases will generally recover. I have known, however, a single toe, all of them, and even a portion of the foot, slough, and yet the patient do well. In these cases you must not amputate; whether there be healthy granulations or not, do not amputate; for as surely as you do, mortification of the stump will supervene, and death quickly ensue.

The next subject of which I shall speak, is

CARBUNCLE.

Of this I shall have but little to say, as many of the foregoing observations are equally applicable to this disease.

Symptoms of Carbuncle.—When carbuncle is about to be formed in any part, it is generally preceded by pain, by a swelling of considerable extent and hardness; this is occasioned by the adhesive inflammation; the surface of the tumour next assumes a livid redness, and a spongy feel; little ulcers now form in the skin, which, from their number, give it a sieve-like appearance, so numerous are the orifices; from these a white discharge passes—this fluid resembles water and flour mixed together; and he who has seen much of car-

buncle, knows the nature of the disease instantly upon seeing these orifices, and the kind of discharge which issues from them. When the little openings are all formed into one, the dead cellular membrane becomes exposed, and begins to separate, having been previously confined by the smallness of the apertures. In gangrene of the extremities, there is not this mechanical obstruction to the sloughing of the dead part. And though gangrene is generally difficult of cure, yet carbuncle usually does well, except when situated on the head or neck. Though persons recover from carbuncles of an enormous size upon the back, yet very small ones on the head or neck will often destroy : indeed I never saw a patient who recovered from any considerable carbuncle upon the head : in these cases there is effusion upon the brain, producing compression. The inflammation which attends fistula in ano will sometimes destroy the cellular membrane of the neighbouring parts, thereby occasioning an enormous quantity of the nates to slough, and yet the patient recovers.

Treatment of Carbuncle.—The peculiar treatment of carbuncle consists in making upon the surface of the swelling, at an early period of the disease, a large crucial incision, for the purpose of affording the dead parts an opportunity of escaping ; then apply the port wine poultice, and give the patient such stimulants as will tend to increase the vigour of his constitution ; and here we shall again find opium and ammonia our most propitious remedies.

OF ERYSIPELAS.

There is something peculiar in this inflammation ; and as it is much disposed to produce gangrene, I will here introduce this subject to your attention.

Its Seat.—Inflammation of the skin is generally extensive, in consequence of the surface being unbroken : so that when erysipelatous inflammation invades the skin, it is not uncommon to see it run from one part to another till half the body is covered by it. Sometimes it is ushered in by fever, and sometimes not. Certain constitutions are sooner affected by it than others, and often its effects appear to be entirely local. But unquestionably it is more frequently constitutional than otherwise.

Characteristic Marks.—Its characteristic appearances are, a florid skin, with vesicles, containing a secretion of an amber colour. It is seldom that the skin suppurates in these cases ; the cellular membrane, however, occasionally does. It is very common for erysipelatous inflammation to terminate in gangrene. You must not consider all cases of inflamed skin erysipelas. I have often seen cases treated as such, which were only inflammation of the skin, sympathetic with wounded absorbents, and tendinous aponeurosis. In the dissection of a person who died of erysipelas in the arm, the cuticle was separated, the skin was filled with blood, and was much thickened ; the cellular mem-

brane immediately under the skin was loaded with serum, and so was that membrane in and between the muscles to the bone.

Of frequent occurrence on the Head.—The head seems to be more commonly affected by it than any other part; it often succeeds the most trifling injury of the scalp; and, like carbuncle, when it occurs in this situation, generally destroys life. I had the misfortune to lose a lady of considerable consequence from its effects, after the removal of a small encysted tumour from the head. It made its appearance three days after the operation, and all the skilful attention of Dr. Baillie was unable to arrest its progress. Thus a trifling operation on the scalp destroyed life, in consequence of having been succeeded by erysipelatous inflammation.*

After a person has once had this disease, he is very subject to repetition of it; and some persons appear to be much predisposed to its formation.

It generally makes its appearance in spring and autumn, but rarely in winter, and not often in summer. Whatever renders the body irritable, predisposes to erysipelas. The slightest causes produce it after operations at certain seasons, and in particular states of the constitution; for it has often happened that the stimulating effects of adhesive plaster have produced this disease, and have led to the death of the patient.† It would appear that this disease is contagious, at least it is certainly true, that if it begins in a ward of our hospitals, several persons become affected by it, and it often extends through the hospital.

TREATMENT OF ERYSIPELAS.

In this town the following plan is pursued, and which, *for London*, undoubtedly is the best. At first give calomel, for the purpose of restoring the secretions of the liver and intestines, and the liquor ammoniæ acetatis with antimony to act upon the secretion of the skin, and then give the sulphate of quinine; it is the most powerful tonic, excites in the stomach a genial warmth, and often will remain in that organ when bark will be rejected.‡

* As I shall hereafter more particularly mention, I have some doubts whether inflammations on the head following slight wounds are truly erysipelatous or not.

† Equal parts of the emplastrum thuris compositum and emplastrum saponis form a better plaster than the common adhesive.

‡ I take the liberty of introducing the following case of erysipelas, as remarkable on account of the great extent of the disease, and also as showing the beneficial effects produced by the exhibition of sulphate of quinine.—July 5th, 1824, J. Hawks, æt. 46, a plasterer by trade, was admitted into St. Thomas's Hospital, on account of an erysipelatous inflammation of the right leg, resulting from a contusion near the internal malleolus. The erysipelas appeared on the evening of the same day on which he received the injury, and he had been previously in an indifferent state of health. When admitted, the inflammation extended nearly to the groin, completely surrounded the extremity; his bowels were confined, and he complained of heat and pricking pain in the affected limb: the constitutional irritation was also

Experiment.—My colleague, Dr. Marcet, now deceased, but late a physician of Guy's, endeavoured to ascertain whether the antiphlogistic, or tonic, mode of treatment was best for this disease; therefore he put two persons into adjoining beds, having erysipelas; to one of whom, after purging him, were given tonics, and a generous diet; to the other, saline medicines, and low diet; blood likewise was abstracted from the latter; they both recovered; the former rapidly, while the latter remained in a debilitated state for a very considerable period.

Cases.—Where erysipelas attacks the lower orders of this town, who weaken their constitutions by the excessive use of ardent spirits, porter, wine, and even spirits, may be sometimes advantageously employed as remedies. Two cases of this disease which I saw in the other hospital, proved the truth of what I am now saying: a man had dreadfully severe erysipelas, his head swollen to an enormous size, and his recovery thought impossible, when it was discovered, one day, that his wife brought him some gin. He declared that he was better from having drank it, was consequently permitted its continuance, and, to the astonishment of all, he rapidly got well. A short time after this another man similarly circumstanced, was brought into the same ward; and from the result of the above case, I directed the sister to give him spirits also; and this patient recovered nearly as

very considerable. He was ordered to take fifteen grs. of the compound pill of colocynth with calomel, and to apply a spirit wash over the inflamed surface: also, to allay irritability, small doses of calomel and opium were directed to be given every night. On the following day, my colleague, Dr. Elliotson, saw the patient with me, and ordered, in addition to the calomel and opium, five grs. of the sulphate of quinine, five drops of dilute sulphuric acid, and two oz. of water, to be taken every six hours: with an allowance of three pints of milk daily. On the 7th, the inflammation had extended a little, and vesicles had formed on the thigh: the former medicines were continued, and castor oil ordered to be taken occasionally as required. 9th. As the pulse was rather feeble, I desired he should have a pint of porter daily, in addition to the other remedies. On the 10th, the erysipelas had extended up the side nearly to the axilla, on the abdomen almost to the median line; it also covered the whole of the nates and back: a spot on the dorsum of the foot appeared disposed to become gangrenous, and he was altogether weaker. He was ordered to take the quinine every four hours, to have beef steaks daily, with another pint of porter, to continue the calomel and opium, and also the spirit wash, excepting to the foot, which was to be poulticed. 11th. The calomel omitted, as his mouth became slightly affected. 12th. To continue and have four ounces of sherry in addition. 13th. Another pint of porter was ordered. From this period he continued to improve, and he took daily beef steaks, three pints of porter, four ounces of sherry, also the sulphate of quinine, every four hours, and the opium at night; the slough on the foot separated quickly from the application of the nitric acid lotion, and the erysipelas gradually disappeared, causing a loss of the cuticle. Matter formed in the cellular texture on the calf of the leg and at the under part of the thigh; it was discharged by incision, and the parts quickly healed.

At one time the erysipelas extended from the toes of the right lower extremity, to the occiput, occupying the whole of the limb, the back and nates, and reaching as far on the abdomen of the same side as the linea alba.

I attribute the favourable termination of this case, in great measure, to the judicious employment of the sulphate of quinine, by my colleague, Dr. Elliotson, which appeared to give tone and vigour to the system, as well as to allay the nervous irritability, so constantly attending this form of inflammation.—T.

speedily as the former. But it is in the debility consequent upon the first stage of the disease that this plan is to be resorted to. The local treatment of erysipelas consists in the application of camphorated spirits of wine in the first stages. When the vesications are either about to break, or are broken, powder the part with starch, and if gangrene be produced apply a port wine poultice, or the nitrous acid lotion, in the proportion of a drachm of the undiluted acid to a quart of water. Fomentations and emollient poultices relax the parts, and dispose to gangrene.*

* Mr. Copeland Hutchinson has advised incisions in the gangrene of erysipelas.

There is another form of inflammation, which I shall term *cellular*, as it appears to be principally situated in that texture. I mention it here, as it is sometimes confounded with true erysipelas, and because it so frequently terminates in gangrene. It is usually situated in the extremities, and is often produced from very trifling injury. I have seen five cases within the last two years in which it arose from slight injury to the elbow, occasioned by the persons falling on the olecranon.

Shortly after the accident, pain is experienced at the wound, and the surrounding parts become swelled, from effusion into the cellular tissue, but the integument is scarcely discoloured; this swelling extends gradually, so as to cover the whole of the extremity in a few days. Constitutional symptoms now arise, the patient is restless, anxious, and has occasional rigors, succeeded by heat; the skin becomes partially discoloured, and on these parts vesicles are formed, which burst, and expose gangrenous spots beneath; when these spots separate, the cellular tissue is found also to be gangrenous, not only the portion thus exposed, but that likewise which is situated to a considerable extent beneath the surrounding integument. By the subsequent separation of this substance the connexion between the integuments and subjacent fasciæ, muscles, &c. is destroyed; and I have thus seen nearly the whole of the integument of the upper arm disunited from the parts beneath.

This form of inflammation differs from the true erysipelatous in the following particulars: The integument is not at first affected, nor does it ever assume the florid colour which attends erysipelas: the constitutional symptoms do not precede the inflammation, but appear to be consequent on the local affection; it also always terminates in gangrene of some portion of the cellular tissue.

The constitutional treatment is much the same as that required in erysipelas; but the local applications should be employed with a view to promote the suppurative process (unless the inflammation be quite incipient). For this purpose fomentations and poultices are proper.

If the separation of cellular tissue has been extensive, great care must be taken to keep the disunited integument in contact with the subjacent parts, otherwise it will be very likely to slough: to effect this I have usually employed strips of the soap cerate plaster, which are applied so as to leave some of the openings uncovered, to allow of a passage for the discharge, until the desired union has taken place.—T.

LECTURE X.

ON INJURIES OF THE HEAD.

THESE injuries are of the most dangerous kind from the influence which they produce upon the brain and nervous system.

The nervous system is composed of the cerebrum, cerebellum, and medulla oblongata, which principally supply the organs of sense and their appendages with nerves, and of the medulla spinalis, with the nerves of volition and sensation proceeding from it. But there is a second system of nerves in the body, called the grand sympathetic, which is distributed to the heart, and to the viscera of the abdomen: it communicates with most of the nerves of the brain, and with those of the spinal marrow: it forms by its branches a large ganglion, or several ganglia, called the semilunar, situated behind the stomach, and a plexus proceeds from this, which distributes branches to the greater part of the abdominal viscera.

The eighth pair of nerves of the brain forms a large communication with the ganglion behind the stomach.

If an injury happens to the head, the functions of volition and sensation are diminished; the stomach is disordered through the medium of the par vagum; and from the general communication between the grand sympathetic nerve, and those of the brain and spinal marrow, the functions of the heart and of the abdominal viscera become affected. The powers of the mind are also diminished; the memory is lost; the judgment is enfeebled: this sensation, volition, the involuntary actions, and the powers of the mind, are diminished or suspended.

Concussion and Compression.—The causes of the symptoms of injury to the brain are two: 1st. Concussion. 2d. Pressure, which may be the result of extravasation of blood, of depression of bone, or of matter produced by the inflammation of the brain.

I shall first describe the symptoms, dissection, and treatment of concussion.

Symptoms of Concussion.—When you approach the bedside of the patient who has a concussion of the brain, you find him in what you would suppose, a sweetly tranquil sleep: his breathing is easy, and not quicker or slower than natural: his pulse is beating with steadiness, and with its usual velocity, and you would be disposed to say, do not disturb him, but let him sleep on. But if you attempt to rouse him, he is with difficulty excited; if he be spoken to, he mutters, and returns an incoherent answer, and you then discover that he is comatose. Upon inquiry it is found, that he has received a severe blow upon his head, that immediately after he was senseless, and unable to stand, and that he had since vomited. At first a torpor exists

in the intestinal canal, and considerable difficulty in procuring an evacuation, but afterwards the fæces are involuntarily discharged : in a few hours the bladder is distended, from the accumulation of urine, which demands the introduction of a catheter for its removal ; but after some time the urine also passes involuntarily.

There is sometimes in these cases bleeding at the nose, and from the blood trickling into the throat and stomach, blood is vomited ; the pupils of the eyes are generally natural ; but if changed ; both are a little dilated ; or sometimes one only. The state of the pulse is curious. Although when the patient is undisturbed it is natural, it scarcely ever fails to be quickened, if the patient is capable of making any effort to rise, and exerts himself for that purpose. The carotid arteries sometimes beat, under an exertion, with a force disproportioned to the other arteries of the body ; but generally this symptom is not observed until after a few hours.

Mind.—The mind is variously affected, according to the degree of injury which the patient has sustained. . In some cases there is a total loss of mental power ; in others the patient is capable, though with difficulty, of being roused to make a rational answer, but again sinks immediately into coma. Sometimes the memory is lost, at others only partially impaired. A case is generally known to surgeons, of a man who, in St. Thomas's Hospital, was found talking in a language which was not understood, until a Welsh woman entering the ward, heard this man talking Welsh, but the blow on his head had occasioned the loss of his recollection of English. I once witnessed a very similar circumstance. I attended a German sugar baker, with disease in his brain ; and when I first saw him he could speak to me in English ; but as his disease increased he lost his English, and I was obliged to have an interpreter, for he could answer only in his native tongue.

It frequently happens, that the patients when roused will be perfectly sensible, and answer any questions rationally ; but if left undisturbed the mind appears to be occupied with some one circumstance, of which they are constantly talking. Mrs. — fell through a trap door, in a house on Bennet's Hill, Doctor's Commons, on the 4th of December. When taken up she appeared as if in a sound sleep ; her pulse was a little quickened, and her breathing natural ; she was bled and purged. 5th. Complained of pain in her head, bled again. 6th. Restless, screams, and says she has universal pain. 8th. More composed and sensible, pulse quick and small ; her bowels keep freely open. 9th and 10th. Sometimes sensible, at other talks incoherently, evacuating plan pursued. 12th. Much better, being more easily roused, still talking incoherently at times : fancying she had been brought to bed of five children, and distressed because she fears she has not milk enough for all of them. She frequently said, " My God what a regiment to go to school ; I must not lie in again for three years." This was accounted for, by her sister having just lain in, and she had come to be with her during her confinement.

She ultimately recovered.

Upon inquiring of patients respecting their accident, they know nothing of it. If the injury has been occasioned by a fall from a horse, they can only remember mounting and riding to some distance, but do not recollect that the animal ran away, or had thrown them ; nor, however perfectly in other respects they may recover, have they ever any recollection of the kind of accident ; yet when they regain any power of volition, or sensation, they will act from habit. This is well illustrated by the following case. June 3d. Mr. S.'s horse ran away in Chiswell Street, and rushing against a dray was killed. Mr. S. was thrown over the dray, and was taken up senseless. I saw him about half an hour after the accident, when he was restless and impatient : he had two wounds on the scalp, one of which penetrated to the bone. He was immediately bled ; but being seized with violent convulsions, and his pulse being slow and weak, the vein was closed. 4th. In the same state as on the preceding evening ; at noon, his pulse being hard and quick, he was bled to twelve ounces, and afterwards became more sensible. 5th. Had passed a restless night ; the pulse full and slow ; he was cupped on the neck. 6th. He ordered the servant to quit the room, got out of bed, bolted the door, and had a stool, but returned to his bed without unbolting the door, which was obliged to be forced open, as they could not rouse him. At another time he lathered himself with his blistering ointment, as he wished to shave ; and washed his feet with some lemonade in the chamber pot. 7th. He was bled to eight ounces. 9th. Ordered calomel in small doses. 10th. His attendants thought he had a fit, but it was only of a minute's duration. 11th. Blisters applied to his temples ; he had two fits in the night, one lasted ten minutes, during which he struggled, foamed, and was insensible. Dr. Babington saw him. 12th. Complained of pain in his head ; he was bled to four ounces, and purged. 13th. Pulse 65, had been before about 60. Chilly pain over his eyes, again bled in small quantity, and purged. 14th. Very restless ; mind wandering ; quarrelsome ; bowels freely open, pulse quick, his nose bled twice. 16th. Much better, his skin moist, easily roused, more sensible, and listens to conversation. 20th. Answers questions more readily ; much improved. He gradually got quite well, but did not recollect any thing about his ride previous to the accident.

It is curious to observe the change which takes place in the intellectual faculties, as alterations are produced in the structure or state of the brain ; the gradual diminution of ideas which have been recently acquired, until, at length, they become wholly obliterated. Old persons are observed to be fond of relating the anecdotes of their youth, forgetting incidents of more recent occurrence ; and the change produced by injuries to the brain is somewhat similar to the effects of age ; the patient loses impressions of a recent date, and is sensible of those which he has received in his earlier years.

The degree of injury sustained by the brain in different cases, however, varies greatly. Some are only stunned or deprived of sense for a moment, others recover in a few hours ; some remain, in a great

degree, insensible for fifteen to twenty days. Some recover entirely, others have afterwards an imperfect memory. A partial loss of sense will be sometimes produced in the function of one eye, or deafness in one ear, and so of volition, as the squinting will continue which has been produced by an injury of the brain. A degree of fatuity, in some cases, ever afterwards remains; great irritability will continue in some persons, in others the least excitement will produce pain in the head. In one case I knew a remarkable irritability of the stomach remain after concussion of the brain; so that the least excitement would produce vomiting; and this symptom, as well as the usual occurrence of vomiting in these accidents, is probably produced by the direct communication between the brain and the stomach by the eighth pair of nerves.

Case.—Mr. T., a medical gentleman, received a blow on the forehead, during a riot which he was endeavouring to quell: he was stunned for a few moments, but did not immediately find any further inconvenience from the injury. A few weeks afterwards he began to feel a constant nausea, followed by occasional vomiting, which, at first, occurred once, then twice in the course of the day, and at length became very frequent. Sometime after he had received the blow, he was trephined by my uncle, formerly surgeon to Guy's Hospital, but he did not derive any advantage from the operation. The nausea and vomiting still continued, he became emaciated, was in a constant state of anxiety and distress from the nature of his complaint, and died exhausted, in consequence of the injury.

A permanent loss of memory is sometimes the effect of these accidents; frequently the patient has a difficulty in uttering the words which should express his ideas, and uses wrong terms; the judgment is enfeebled, giddiness, pain in the head, and great irritability of the nervous system, sometimes result from concussion.

Case.—Mr. Blanchard was overturned in a carriage in 1816, and wounded on the forehead by the stud of the window. In twenty minutes he became sick, and was speechless, though quite sensible: he had severe spasms in all the muscles, and a creeping sensation in his whole frame. On the third day he returned home; for four days after he had delirium; this was followed by great debility, which continued for a year, so that he was scarcely able to walk; the whole head was cold and benumbed; he had frequently, from attention to business, or excitement of mind, numbness and coldness of the head, and delirium. Two years ago he had apparently recovered, and he travelled to the Lakes; on his return he had swimming in the head, sickness, and delirium; he was bled freely for the first time; and, excepting once, has ceased to be delirious since. An incision was then made on the part injured, and the bone was found to have been slightly fractured. A year and a half ago he became delirious for half a day; but when this subsided his legs became painful yet benumbed, and was succeeded by lameness, which continued for a year.

His present state, August 1824.

1st. Difficulty of utterance, and in expressing the ideas he wishes to convey.

2d. Benumbed sensation in the head and legs.

3d. Great debility.

4th. Affected by weather ; in a humid day has more numbness and debility.

5th. Exertion of mind augments his unpleasant feelings. Exercise increases the numbness in the head and legs. Sight is weakened. Sleeps exceedingly well.

6th. Pressure on the cicatrix benumbed the part, and made him almost speechless.

7th. A leech applied upon the part produced most excruciating pain for an hour, with spasms. He has tried a great variety of remedies, without effect.

I have known concussion arise from the general shake of the body, unaccompanied by any blow upon the cranium, pain in the head succeed, with the usual symptoms of concussion, and the patient's life be greatly endangered.

Dissection.—With respect to the state of the brain under concussion, when the injury has not been excessively severe, it seems that the symptoms are merely the effect of a disturbance of the natural course of the blood through the brain. A fit of vomiting, by forcing the blood through the brain, will sometimes almost immediately restore the functions of the mind and body. It seldom happens, that this state of the brain destroys : but when it does, nothing is found upon the examination which will account for the symptoms. It is, therefore, an alteration of function, but not a disorganization.

Laceration.—But when the concussion is very violent it is attended with lesion of the brain. We have a number of preparations before us, showing this state of the brain, in which you will see laceration of it accompanied with slight extravasation.

The first example of this which I witnessed was in a patient of Mr. Chandler's in this hospital.

Case.—John Stam was admitted into St. Thomas's Hospital, Saturday, Feb. 15, 1793. By the overturning of a cart he had received a wound in the arm, and had some symptoms which led the surgeon to think him intoxicated. On visiting him a few hours afterwards he seemed to be perfectly sensible, but had lost his speech. There did not appear to be any injury of the head, on an attentive examination, yet by signs he led us to think this the injured part : his pulse was full and quick. He was bled and purged, and on the following morning his pulse was smaller ; he had slept soundly, and seemed to be much disposed to sleep. On the following day he continued pretty well, taking plenty of nourishment. On the 18th, in the evening, he had a sudden change for the worse ; his features altered, his mouth was drawn a good deal to the side ; he had difficulty in swallowing, and

his urine and his fæces passed off involuntarily. He continued thus until the morning of the 20th, when all his bad symptoms left him, excepting the loss of speech. He remained free from any other symptoms for many days (excepting hiccough); but then his appetite began to fail him, and he became emaciated. He had, about a fortnight after his admission, a return of the difficulty of deglutition, and the urine and fæces again passed off involuntarily. He had now every evening at nine o'clock a delirium come on, which rendered it necessary to strap him to his bed, as he struggled violently. On the 8th of March he died, just three weeks after his admission. The wound in his arm discharged but little the first two days, but afterwards it wore a very bad aspect. He had enjoyed a good state of health previously.

DISSECTION.

On examining the head, the scalp and cranium were found free from injury. The dura mater also appeared healthy. On the pia mater there was some slight effusion of a transparent serum; on cutting away the hemisphere to show the centrum ovale, the brain was found lacerated. The colour of the medullary substance, as well as the cortical, was changed to red in many places, and the size of the laceration was about two inches long by an inch wide. The substance was very soft, and it appeared ragged. There was a small quantity of purulent matter found in some places. Ulceration seemed to be present, as there were a number of small holes in the brain surrounding the laceration.

Case.—Another very extensive case of laceration occurred in the person of a friend of Lord Nelson's. Mr. Coppendale, 27th June 1805, fell from his horse in the Borough, and was brought to Guy's Hospital. He had a wound on the back of his head, which bled freely. He was totally insensible; the pupils were dilated; the pulse 60, and regular. He was bled from the arm to a considerable extent before he could swallow, and an enema was administered.

On the second day he was insensible, his pupils were contracted, and remained so in the dark or light. On the third day he gave signs of returning reason; swallowed freely, and could be roused to answer a question. He performed all the animal functions, and asked for the means of doing so. He knew several of his friends. His pulse still at 60. He said he was very well, and wished to rise; but frequently complained of his head. On the fourth day favourable symptoms began to vanish; he became more sleepy, and more difficult to rouse; and when Lady Hamilton called upon him, he could not be made to open his eyes, or speak to her. From this day the torpor increased; he passed his stools and urine in bed; his eyes became nearly insensible to light, though one of his pupils was still contracted, and the other remained to the last moment of his life dilated and immovable. He slept almost constantly, though with frequent intervals of restlessness. He had no convulsive motions, excepting a slight subsultus

tendinum a few hours before his death. His heat remained natural, until thirty-six hours before he died, when it was irregular and unequal ; the face, by turns, red and pallid ; the legs, one warm, the other cold ; forty hours before his death the pulse began to flag, but quickened on the least motion : at one time it was 70, and in ten minutes after 120 ; a few hours before death it was constantly quick, to 150, and sometimes higher ; the breathing only thirty times in the minute.

The treatment pursued was, bleeding, blisters to the neck, and synapisms to the feet.

DISSECTION.

Extravasation on the scalp, some blood on the dura mater and brain, and some from the lateral sinus of the dura mater, which had been torn. Brain torn in five different places, two in the anterior, three in the middle lobes.

Skull fractured at the basis, through the meatus auditorius ; petrous portions of the temporal bones and sella tursica.

The following is also an interesting case :

Case.—A waiter at a coffee-house in the Strand, who had been previously subject to epileptic fits, was ordered to clean the windows of the first floor of the house ; and whilst in the act of doing so, and standing on the outside of the window, he was supposed to have been seized with a fit, and fell into the area beneath. On being taken up, a wound was found on his forehead, and he had lost both sensation and volition. Having resided in the Borough, he was carried to Guy's Hospital, and when admitted there, a fracture was discovered in the os frontis, but without any depression of the bone ; and as he had no symptoms of compression, the operation of trephining was not performed. On the following day to that of his admission he died, without having, in any degree, recovered from the accident.

When the head was examined, the fracture was found confined to the upper part of the os frontis ; and opposite to the fracture on one of the anterior lobes of the cerebrum, a considerable laceration was discovered. On the falx major was situated a large patch of earthy matter, evidently of long standing, which had probably been the cause of his epileptic fits.

If, then, it be asked, in what does concussion consist ? the answer is, that if it be slight, it is merely a disturbance of the circulation in the brain ; if violent, the brain is lacerated. A knowledge of this leads to a judicious treatment of the injury, as laceration of the brain is frequently followed by extravasation : and concussion in the commencement, may be compression in its result.

TREATMENT OF CONCUSSION.

The great danger which we have to guard against in the treatment of concussion, is inflammation of the brain. This principle must di-

rect our practice ; and in order to prevent inflammation, we must soon after the accident take away a very considerable quantity of blood. By bleeding largely, we not only remove existing inflammation, but we prevent that which would otherwise occur. This practice, however, may be carried to excess. You must, in the repetition of bleeding, regulate your conduct by the symptoms ; observe whether there be any hardness in your patient's pulse, and whether he complains of pain in the head, if he have still the power of complaining : watch your patient with the greatest possible anxiety ; visit him at least three times a-day ; and if you find any hardness of the pulse supervening, after the first copious bleeding, take away a tea-cup full of blood ; but do not go on bleeding him largely, for you would by this means reduce the strength of the patient too much, and prevent the reparative process of nature. It is necessary that there should be a slight degree of inflammation, for without this the reparative process cannot proceed, or the patient ultimately recover : but it will be your duty to keep this inflammation within due bounds. I shall mention a case in which fatal consequences ensued from the error committed by the surgeon in bleeding his patient to such excess, that the slight degree of inflammation necessary for adhesion was removed, and the restorative process of nature consequently prevented.

In these Lectures, gentlemen, I feel it to be my duty to describe to you surgery as it is, and not in the glowing colours in which it is painted to you in books. I am most anxious that you should omit nothing which may contribute to increase your professional skill, and enable you to afford the greatest possible degree of relief to the sufferings of humanity ; but those who blazon forth our profession as one which is attended with undeviating success, are only deceiving you. You must hear the untoward cases of your profession, as well as those of which the issue is favourable, in order to form a correct judgment in your minds, of what surgery really is. It is for these reasons, that I shall never hesitate, "*coute qui coute*" to detail to you, and perhaps to the public, those cases which have terminated unfavourably. I have a duty to perform, and I shall never shrink from the discharge of it. It is by detailing to you the unfavourable as well as the favourable cases, that I can alone perform that duty ; for it is by such a course alone that I can point out to you the rocks which you are to avoid, as well as the haven in which you are to endeavour to anchor. The case, to which I last alluded, was one of concussion, accompanied with slight laceration of the brain, which occurred in the other Hospital. The gentleman, under whose care the patient was, thought it right to bleed him, and that he could not bleed him too largely. He accordingly bled not only from day to day, but twice a day. The consequence of this mode of treatment was, that the patient became perfectly pale, was in a state of considerable dejection, not of the mind, but of the powers of the body, and died, without any symptoms of inflammation of the brain, ten days after the injury. On examination of the head, it was found that there was a slight laceration of the brain, with some

degree of extravasation of blood ; but that not the slightest attempt had been made by nature to heal the wound. You are aware that the brain heals, like any other organ, by the process of adhesion ; but, in this case, the quantity of blood taken from the patient was so large, that the slight inflammation necessary to the adhesive process was removed, and the powers of restoration consequently prevented. Still it is often necessary to take away blood after the first large bleeding ; but it must be taken in small quantities, and you must watch the patient with the greatest possible anxiety ; for the symptoms can alone regulate your practice. Sometimes it is necessary to take away large quantities of blood, in repeated bleedings. I was called to a gentleman, of very full habits, who had fallen from his horse in riding to London. Mr. Constable, of Woodford, who attended him, had already bled him, but I judged it necessary to bleed him again, largely ; and I took blood in smaller quantities from him, day after day, watching the pulse with the greatest anxiety, and bleeding him so far as to reduce the hardness of the pulse, without diminishing too much the powers of his body. The whole quantity of blood taken from this gentleman, by bleeding from the arm, opening the temporal artery, and the application of leeches, as far as this could be estimated, amounted to about two hundred and eight ounces of blood. One hundred and eighty ounces were taken from the arm, the rest by leeches and from the temporal artery ; yet such was the hardness of the pulse, that at the last bleeding there was some degree of inflammation of the brain remaining. This gentleman recovered.*

* I have taken the liberty of introducing the following case as one of considerable interest ; the patient having, for some time previous to the accident, been subject to symptoms of cerebral affection :—

William Smith, æt. 19, a stout, tall, and robust man, fell into a cellar, about twenty feet deep, and appeared to have fallen on the right side of his head, there being two small wounds of the scalp on that part : the pericranium was not detached. Tuesday, March 11, 1823, he was brought into the hospital, in a state of insensibility ; his countenance flushed, both pupils contracted ; but, upon disturbing him, they became very much dilated, and varied in appearance very frequently. Pulse quick, hard, full, and regular ; he was excessively restless, and upon every slight exertion the pulse became very much accelerated ; the breathing was slightly stertorous. From sixteen to eighteen ounces of blood were taken from the arm immediately ; after which the pulse became rather softer, breathing less audible, and a slight degree of faintness was produced. At five o'clock the same day, the pulse having risen from 90 to 116 in a minute, eighteen ounces more blood were taken, which had a more marked effect on the pulse, and produced a greater degree of faintness than the former ; but he again became very restless, and at twelve o'clock the same night, lost twenty ounces of blood from the back part of the neck by cupping : the head was shaved and a spirit lotion applied over the whole surface ; twenty grains of the colocynth and calomel pills were given. Wednesday, 12th, Had passed a very restless night ; remained much in the same state. Pulse quick and frequent, but not having had any evacuation from the bowels, six grains of calomel and ʒss of rhubarb were given. At half past eleven o'clock, A. M. he was again cupped at the back part of the neck, and lost fourteen ounces of blood : a large blister was applied to the back part of the neck : he was still unable to answer any question put to him : the state of the pupil varied as before. Four o'clock, a glyster was given, containing an ounce of castor oil, but produced no evacuation. Seven

You are to use bleeding as a means of preventing inflammation; but you are not to resort to it as a matter of course, the moment you are called to a patient under concussion. A man falls from his horse, and the instant he is raised from the ground some surgeon thinks it necessary to use the lancet. This conduct is quite irrational; for, suppose the pulse could scarcely be felt at the wrist, and the surgeon were in such a case asked why he proceeded to bleed, what would his answer be? The probability is, that he could make no reply; or he would perhaps say, that he bled because the accident had determined a great quantity of blood to the brain. It is not with this view that we bleed in concussion, but in order to prevent inflammation. I have seen patients, who would have died if a large quantity of blood had been taken away at the time of the accident. Thus in the case already described, when I first saw it, the pulse was scarcely perceptible. I took a little blood from the arm, and the patient was immediately seized with convulsions, like an epileptic fit, which I thought would have proved fatal. I closed the arm, and I would not upon any account have taken more blood from him at that moment.

Case.—Some time ago I saw a man, at the other Hospital, who had received a blow on the head. He was pale and dejected, and his pulse could scarcely be felt. I said to the dresser, you must not bleed this man at present: there is rather too little action than too much. Wait till the pulse rises, and then bleed him. In the evening re-action took

o'clock, five grains of calomel and twenty grains of jalap were given, and another glyster at eleven o'clock. A short time after the latter, he had a considerable evacuation, which reduced the pulse in frequency and fulness. Thursday, 13th, had passed a restless night, but less so than the previous one; the bowels had been freely evacuated, and he was much reduced; his pulse became small and frequent, and his countenance rather pallid; he appeared conscious of what was said and done, but unable to answer any question. The blister was kept open and discharged considerably. Friday, 14th, remained restless, and unable to answer any question: pulse quick and frequent; bowels moderately open; an ounce of castor oil was given; blood was again taken from the arm to the extent of fourteen ounces; and two grains of calomel, with a grain of conium, given at bed time. Saturday, 15th, Much the same: had taken two pills in the morning, and was to repeat them at bed time: he appeared much more conscious of what was said, and could answer questions occasionally. Sunday, 16th, Having passed a restless night, and his pulse being quicker and fuller than the previous day, he was again bled to the extent of eighteen ounces, and which, when coagulated, had a buffy appearance on the surface; but the crassamentum remained loose: the pills were continued as before. Monday, 17th, Had passed a better night, and answered questions much more readily: the pills continued. Tuesday, 18th, Opening medicine was given. Wednesday, 19th, Had been more restless than the former night: pulse quick, hard and full: countenance flushed: he was bled from the arm to fourteen ounces: pills continued, &c. Thursday, 20th, Much the same; eight ounces more blood were taken: pills continued, &c. Friday, 21st, Less restless than before: bowels rather confined: infusion of roses. \mathfrak{z} jss. and Epsom salts \mathfrak{z} j. were given, three times a day. Saturday, 22d, Complained of slight pain in the head: pulse quick; bowels open: eight ounces of blood were taken; after this he gradually recovered, and was discharged from the Hospital on Wednesday, April 23d, 1823.

The quantity of blood taken amounted to one hundred and thirty ounces in the space of eleven days.—T.

place ; the pulse rose, and the dresser then very properly bled him. Inflammation was by this means prevented, and the man did well. The principle on which you should act, gentlemen, is never to do any thing in your profession without a good reason, which, whatever may be the result of the case, will leave your conscience clear. You are not to bleed because a patient has received a blow upon the head, but you are to bleed to prevent inflammation ; and I hope to be understood, that it is not to bleeding that I object, but to immediate bleeding in those cases in which there is a remarkable depression of the nervous power.

Emetics.—Emetics have been proposed as remedies for concussion, and I certainly have seen vomiting useful ; I consider the efforts of nature to relieve herself, after injuries, as generally salutary ; and thus it is that the vomiting, which is excited in cases of concussion, acts beneficially, by relieving the stomach of its contents, and by propelling the blood to the brain, and thus restoring the powers of life. But the vomiting excited by nature often restores the patient to his senses only for a short time ; he is sometimes relieved, but without continuing so long ; he looks about him and lapses into his former state of aberration of mind, from which he had received merely a temporary relief. When emetics are exhibited as a remedy in concussion, there is only one thing that I fear from their use ; when there is any extravasation of blood in the brain, or any tendency to apoplexy, then they should be used with caution ; and it is on that account that I wait two or three hours after the accident before I order them. It is in lenient cases of concussion that they are useful ; in lacerations of the brain they are dangerous.

Purgatives.—With respect to the exhibition of cathartics, the bowels should be kept open by calomel purges, followed by the infusion of senna and sulphate of magnesia. The calomel should be given about two hours after the accident ; and it will be useful to give it to the patient, at the same time, a quantity of acidulated drinks ; as by this means a disposition to purging is kept up, counter irritation is produced, and the blood is drawn from the brain to the intestinal canal. Submuriate of mercury is proper as a medicine, and lemonade as a drink.

Diaphoretics.—Perspiration is very desirable, and for this purpose antimonials are employed. The pulv. ipec. comp. (Dover's powder) is not generally used to produce moisture of the skin, on account of the opium it contains, as it confounds the judgment, and prevents you seeing what are the effects of the opium, and what those of the injury ; for opium produces the same effects upon the brain as some of the injuries to which it is liable.

Counter Irritation.—Counter irritation is of use, but not until other means have been resorted to ; the object in applying blisters is, by exciting inflammation of the scalp, to subdue the inflammation of the brain when other means have failed. I have known a patient with pain in the head, sickness, loss of strength, and throbbing of the

carotids, who had been relieved by free bloodletting for about two hours only, much benefited by the application of a blister.

Trephining for after-symptoms.—For the symptoms remaining after concussion, the trephine used to be employed; but it now becomes a question, whether it ever ought to be resorted to in these cases? What will trephining do? Probably great harm, by disturbing the brain; and, if not, no good can possibly result from it. Now for the proof: first, that it does no good. Gentlemen, I never lecture to you but from the recollection of some case that has occurred to me, from which I form my opinion. In a former part of this Lecture, I mentioned to you a case of great irritability of the stomach, produced by concussion, the effect of a blow on the forehead, which happened at Yarmouth, in Norfolk. Mr. W. Cooper, formerly surgeon of Guy's Hospital, visited this gentleman, and prevailed upon him to suffer the trephine to be applied upon the part of the forehead on which the blow was received; and, when the bone had been removed, the dura mater was sound, and no relief whatever arose from the operation; a direct proof that it is useless. Dr. Farre informed me, that he knew a person who was subject to epileptic fits after concussion of the brain. The operation of trephining was performed, and he died soon afterwards.

Forty years ago, trephining used to be the plan generally adopted with the patients admitted into the London Hospitals; many were submitted to the operation; inflammation of the membranes of the brain supervened, and nearly all died; recovery being very rare. But do our patients now die from the effects of concussion? No; by depletion we rarely lose a patient.

After the expiration of my apprenticeship at these Hospitals, I went over to Paris, to see the practice of Desault, at the Hotel de Dieu; and there I found that scarcely ever under any circumstances did he trephine; and he was more successful than the English surgeons. Trephining in concussion is now completely abandoned.

In the treatment of concussion, when the patient has any mental power remaining, let all excitement of the brain be avoided. I was very much struck, about twelve months ago, with the following circumstance: a young gentleman was brought to me from the North of England, who had lost a portion of the skull, just above the eyebrow; and I was asked (for it was for this purpose that I was consulted) what protection should be given to the brain. On examining the head, I distinctly perceived the pulsation of the brain was regular and slow; but at this time he was agitated by some opposition to his wishes, and directly the blood was sent with increased force to the brain, the pulsation became frequent and violent; if, therefore, you omit to keep the mind free from agitation, your other means will be unavailing. All common external stimuli should be abstracted, as light and noise. A dark and quiet room must be recommended.

Treatment of Children.—Lastly, in the treatment of children: as you cannot always bleed them from the arm, you must give the sub-murias hydrargyri (calomel), with acescent drinks, so as to purge

them ; leeches must be applied to the temples : and you may open the jugular vien.

For the symptoms which remain after concussion, as pain in the head, giddiness, diminution of sight, and deafness, it is right to wash the head with spirits of wine and water ; or to use the shower bath. These are the best means for giving power to the nervous system, and bringing the action of the brain into a healthy state. Sometimes I advise ungt. lyttæ to be rubbed upon the head, and pil. hydrarg: and ext. colocynth comp: to be given. Electricity, in nervous debility of an organ, is sometimes useful. In long-continued pain of the head, I sometimes make an incision in the scalp, and open an issue, for the purpose of supporting external irritation ; and have seen advantage arise from producing a slight exfoliation.

LECTURE XI.

COMPRESSION OF THE BRAIN, THE CAUSES WHICH GIVE RISE TO IT ; ITS SYMPTOMS, AND THE TREATMENT WHICH THOSE SYMPTOMS REQUIRE.

Symptoms.—WHEN a patient has a loss of sensation and of voluntary motion, an apoplectic stertor, slow labouring pulse, and one or both pupils dilated, it will be generally found that the brain is compressed.

Causes.—The causes which produce compression are three : 1st, Extravasation of blood ; 2d, Fracture with depression ; and, 3d, A formation of matter within the skull. These are the three causes which give rise to compression.

From Extravasation.—I shall first describe compression when produced by extravasation. When the brain is compressed by extravasated blood, the symptoms do not occur immediately after the accident ; the person at the time of the injury is stunned, recovers himself, and a short time after falls into a comatose state, and then the apoplectic stertor begins. I will relate to you some cases to illustrate this. A child was playing on a chair, from which it fell on a stone floor, and received a severe blow on the head : the child cried violently, was sick, but was during the evening insensible. It was put to bed a little before its usual time ; in the night, the servant was disturbed by its restlessness, and on the following morning it was found dead.

Case.—Mr. R. W., æt. 19, was driving in a gig with his brother, when turning a corner to the right, the horse ran away, and in endeavouring to stop him the rein broke : he then vaulted over the hind part of the gig, and fell upon the back of his head, neck, and shoulders : he got up, but complained of pain in his hip and back ; he drank a

glass of water, and was then taken to the stables in the gig, where he remained half an hour, complaining of sickness, after which he walked about two hundred yards to the house, and got into bed, still feeling very sick: torpor gradually came on, and his extremities became cold. The accident happened at five o'clock on the 24th of April, and he died about two o'clock on the following morning.

Case.—Thomas Fennel, æt. 70, having fallen from a height of twenty-two feet, was brought into St. Thomas's Hospital, on the 1st of October, 1816. A lacerated wound was found in the scalp, over the right parietal bone, but no fracture. His pulse was slow and labouring: his pupils dilated: his breathing was natural: he had not vomited. About $\frac{1}{2}$ j of blood was taken from his arm, when the pulse rose, and became soft. In four hours after, being very restless, and his pulse having risen, another $\frac{1}{2}$ j of blood was taken away; his pulse became softer; he had intervals of sensibility, but was extremely restless. In the evening he became again perfectly sensible, and muttered a great deal; his pulse was feeble and quick; shortly afterwards his breathing became stertorous, his extremities cold, and he gradually sunk.

DISSECTION.

There was no fracture of the skull: but laceration of the left middle lobe of the brain, with extravasation of blood into the left lateral ventricle, and into the substance of the brain near the lacerated part.

When extravasation is combined with concussion, the symptoms of concussion, such as I described to you on a former evening, first appear, and the apoplectic stertor and other symptoms of compression succeed.

Case.—A gentleman was at a party with some friends. He drank freely of wine, and became inebriated. His home was at some distance from where he spent the evening; and his friends, seeing that he would be exposed to great risk, wished him to stay in London; but he could not be prevailed upon to do so. He mounted his horse, and on the way was thrown. He was carried home in a comatose state; symptoms of concussion showed themselves in a loss of voluntary motion and sensation; at first no signs appeared of extravasation of blood: at two o'clock on the following morning the apoplectic stertor began, and at eleven he died.

Case.—A boy was admitted into Guy's Hospital, Oct. 3d, 1816, with an injury to his head; he had been thrown from a horse. He was taken up insensible, and shortly after he vomited: his pulse being very feeble, he was not bled. 4th, He was comatose; the pupils were dilated, but contracted on exposure to light: He could not be roused: his breathing natural: the scalp was sound, but much tumefied in two or three places; an incision was made into the largest of these swellings, which was situated at the upper part of the occipital bone; when a fracture was discovered extending towards the basis, but there was not any depression. He was bled from the arm to sixteen ounces. In

the evening, his bowels were freely opened by the action of some calomel he had taken: he was very restless, and resisted when an attempt was made to open his eyes: at night he continued extremely restless, and his stools passed involuntarily. 5th. Still rather restless; pupils dilated: took occasionally barley water. In the evening the breathing became stertorous, and he gradually sunk.

DISSECTION.

Much blood was effused over the left hemisphere of the brain under the dura mater, more particularly on the middle lobe. The fracture only extended through the occipital bone; it commenced at the right superior part, and passed obliquely downwards through the crucial ridge to the left and inferior part of the bone.

In this case then the symptoms of concussion first came on, and those of compression succeeded.

The extravasated blood producing compression of the brain, is met with in three different situations:—first, between the dura mater and pia mater; second, between the pia mater and brain; and, lastly, within the substance of the brain itself. In the specimen on the table before me, three ounces, the largest quantity I have seen, was effused under the dura mater. In this case also there was a large quantity extravasated, opposite to the anterior and inferior angle of the parietal bone; and the dura mater itself was torn. Mr. Abernethy first pointed out that the largest extravasations were at that part of the skull in which the artery of the dura mater passes through the parietal bone. Secondly, between the pia mater and brain: this is of more common occurrence; and in this case a large portion of the brain will often be found covered with blood; not that the quantity of blood extravasated is considerable, but a little is diffused over a large space. This portion of brain before me was taken from a man who fell from the yard-arm of a ship, and who was carried to Guy's Hospital: he died four hours after his admission; and, on examination after death, many of the vessels which pass from the pia mater to the brain were found torn through. Thirdly, within the substance of the brain itself: this specimen was taken from a patient of Mr. George Johnson's, of America Square, who fell from his horse, and was found with symptoms of concussion of his brain, for which Mr. J. attended him, and by the judicious means he employed redeemed the patient from all his urgent symptoms; but some weeks after, having neglected the rules of conduct which had been recommended for his guidance, he was seized with symptoms of inflammation of the brain, of which he died.

Mr. Johnson and myself examined the head together; and we found, in one of the anterior lobes of the cerebrum, a coagulum, deeply seated, and a little altered in colour from the usual appearance of recently extravasated blood, having a brownish tinge: the brain adhered firmly to

the circumference of the coagulum, and exhibited other marks of inflammation.

The diseased part is preserved in the collection at St. Thomas's Hospital.

These are the three situations in which extravasated blood is principally found. I do not observe any variety of symptoms produced by the different situation of the blood ; the symptoms of compression arise from the pressure of the blood ; and the quantity of blood effused will depend on the size of the vessel of the dura mater that is divided ; whatever is the situation of the blood, the symptoms of compression vary but little ; if there should, however, be any blood resting on the origin of a nerve, there will be partial paralysis of those parts which that nerves supplies.

Treatment.—In the treatment of these cases, there is little to be done but to deplete freely, for the purpose of preventing irritation and inflammation ; the bowels are to be opened, and the patient kept very quiet. If there be a bruise, indicating the spot at which the injury has been sustained, you may trephine, after every other means have been tried ineffectually. If a fracture exists, and the symptoms do not yield to depletion, you will trephine to seek the extravasation. If blood be not found between the dura mater and skull, do not puncture the dura mater to seek for it ; it is of no use, as the blood is coagulated and will not escape, and it is seated under the pia mater, or in the brain itself.

OF FRACTURES OF THE SKULL.

These fractures are not usually in themselves dangerous, but they become so by being united with concussion or extravasation ; when, therefore, you are called to a case of wound in the scalp accompanied with fracture, you inquire as to the nature of the symptoms, to learn if they be those of concussion or extravasation, and you regulate your treatment in the way in which I have already described. There is also a remote danger in fractures of the skull, from inflammation.

Fractures at the basis of the skull are extremely dangerous, because they are generally united with extravasation ; or if not, inflammation of the brain, from the violence of the injury, very often supervenes. The mode in which these fractures are produced is by falling from a great height on the summit of the head. The whole weight of the body is received on the foramen magnum, and cuneiform process of the occipitis ; great injury is in this way done ; for in many cases a transverse fracture through the foramen magnum, cuneiform process, and part of the temporal bone, is the consequence ; a discharge of blood into each meatus auditorius accompanies it ; and, where there is no other mischief, deafness sometimes remains for life.

The following cases of fracture, at the basis of the skull, will best show the manner in which these injuries occur, as well as the fatal effects produced by them.

Case. — On Thursday, the 17th August, Charles Ellis, a private in the Coldstream regiment, fell from a ladder, about eight feet high, into a cellar, and pitched upon the right side of his head and shoulder: immediately after the accident he was brought to Guy's Hospital. On his arrival he was perfectly sensible, and answered every question that was put to him: the men who conveyed him to the Hospital said that he was insensible for a short time after the accident. On examining his head, a small tumour was found on the lower part of the right parietal bone, and a slight discharge of blood from the right ear. As he was quite sensible, and did not complain much of pain in his head, he was bled to the extent of $\frac{3}{4}$ xiij, and a purgative was given. He vomited a great part of the night. On the following morning, his pulse being quick and strong, $\frac{3}{4}$ viiij of blood were taken from the temporal artery, a draught of castor oil was given at the same time, but was very soon rejected: an enema was then administered, which was followed by a small quantity of fæces. On Saturday morning he was insensible; his pulse upwards of ninety, and strong: sickness and vomiting continued: his thirst great: the skin hot and dry: he was bled from the arm to the extent of $\frac{3}{4}$ xij, and an enema was administered. In the evening I saw him, and took away $\frac{1}{2}$ j of blood from the arm, and the enema was repeated. Sunday morning, the patient still remained insensible; his pulse ninety, and strong: when the bleeding was repeated to the same extent as on the preceding evening, and an enema administered, which was followed by a larger quantity of fæces than any of the preceding. I saw the patient in the afternoon, and found the symptoms somewhat abated: the enema was repeated the same evening. Monday morning, the pulse not so quick and strong as on the preceding day; the skin was covered with a gentle perspiration; the patient still insensible: the pupils dilated. There was no sickness or vomiting now, except when food or medicine were given, which were immediately rejected: the enema was repeated. In the evening the pulse was quicker, and the symptoms not so favourable as in the morning; ordered venesection to $\frac{3}{4}$ xij and another enema. Tuesday morning; pulse quick and small: pupils dilated: stools passed from him involuntarily; the tumour on his head was opened, but no fracture or depression was discovered. The following morning he died.

APPEARANCES ON EXAMINING THE HEAD AFTER DEATH.

A fracture was found on that side of the head on which the injury was received, extending through the temporal bone, and nearly through the sphenoid bone: there was considerable extravasation on the same side of the head between the dura mater and skull. On the opposite side the extravasation was much greater, between the dura mater and brain; covering nearly the whole surface of the brain on the left side. There was not any thing peculiar in either of the ventricles; but there was a small laceration of the cerebrum on the left side of the head.

Case.—June, 1814, Joseph Constable was brought into Guy's Hospital, having fallen about twenty feet, on the railing of a house. When admitted, he complained of great pain in his head and shoulder. There was a wound over the right mastoid process, and another on the shoulder, from which he had lost a considerable quantity of blood. In the same day he became comatose; purgative medicines and injections were administered, by the action of which he appeared a little relieved. On the following day he was delirious, and his pulse full and hard; sixteen ounces of blood were taken from the temporal artery, and purgatives again given. The next day he was quite comatose and had the left side paralyzed; in this state he remained until the following morning, when he died.

DISSECTION.

The dura mater was detached from the transverse ridge of the occipital bone, and from the petrous portion of the temporal bone. There was an extensive comminuted fracture of the petrous portion, with some slight extravasation between the dura mater and bone.

Case.—March, 1816, James Devall, æt. 48, a sailor, fell from the main deck of a vessel into the hold, a height of about eighteen feet. When taken up he was insensible, and a large wound was discovered on the upper and interior part of the scalp, at the left side. He was brought to St. Thomas's Hospital within half an hour after the accident, with the following symptoms: total loss of sense and voluntary motion; slow stertorous respiration; permanent dilatation of the pupils; hæmorrhage from the left ear, and a frothy discharge from the nostrils; pulse intermittent: twelve ounces of blood were taken from his arm, without altering the symptoms, and he died about two hours and a half after his admission.

DISSECTION.

Under the dura mater, over the right anterior lobe of the cerebrum, between three and four ounces of dark grumous blood was found. On removing the brain a very extensive fracture was discovered, beginning above the right mastoid process, and extending forwards to the anterior part of the squamous portion of the temporal bone, inwards through the petrous portion, and backwards through the foramen magnum. Another fracture extended across the anterior part of the basis of the skull.

A fracture within the orbit sometimes occurs, from which a specimen, now in the Collection at St. Thomas's, was taken; when destruction of life was the consequence of the injury received. I will give the history of the case.

Case.—Thursday, June 27th, 1793—A girl, about 12 years of age, whilst walking with a large pair of scissors in her hand, fell, and the

point of them entered between the eyelid and the fore part of the globe of the eye : on the scissors being drawn out, some blood followed : the eyelid fell, and she was unable to raise it ; she did not, however, complain much of pain in the orbit, and had no pain in her head. Friday, Mr. Wathen was consulted, who, upon examining the part very carefully, found the eye uninjured, and could discover no wound of the conjunctiva or eyelid. The girl walked to Mr. W.'s and returned on foot, without being much fatigued. Saturday : She walked about the house now and then, but was soon tired, and then laid down. Sunday : Free from pain, except a little in the eye, but could not see with the other eye. She still walked about her room with assistance. Monday : Her mother took her in a coach to Mr. Wathen's ; she expressed pleasure from the ride, though unable to see, and in other respects her spirits were good. As soon as she returned, she complained of fatigue, and went immediately to bed. At seven in the evening she was seized with convulsions in her limbs, and now and then her features were distorted. At twelve o'clock that night the convulsions left her, and her senses returned, which had been lost during the fit. She now for the first time complained of pain in her head ; which, she said, was very violent, and attended with a sensation of great weight. At nine o'clock on Tuesday morning, the convulsions returned, and continued until her death, which happened on Wednesday morning.

DISSECTION.

Thursday, July 4. Mr. Coleman and myself examined the body. On opening the cranium, a fracture was found on the orbital process of the os frontis, in which there was a hole, large enough to admit the point of the finger. In the dura mater, opposite this, there was a corresponding opening, with a portion of bone in it ; between the membrane and bone, some extravasated blood was collected. In the pia mater and brain there were also openings : upon the former there were some purulent appearances, in the latter there was an incipient suppuration, with inflammation extending into the ventricle.

It now and then happens, that a blow, received upon the summit of the head, will produce a circular fracture of the entire cranium ; commencing at the top of the head, passing down on each side through the temporal bone, and meeting at the basis. Mr. Chandler, late Surgeon of this Hospital, admitted a case of this description, which happened by the fall of a shutter on the summit of the head ; there did not appear to be any extravasation or concussion ; great irritation and inflammation succeeded, which destroyed the patient ; and after death it was discovered that there existed a complete circular fracture of the skull, and that the anterior portion could be freely separated from the posterior, from the vortex through the sphenoid bone. The skull is in the collection.

A curious fracture of the skull occasionally happens over the frontal

sinuses. When the fracture is simple, if the nose be blown, the air escapes through the opening in the bone into the cellular membrane under the skin, and renders the forehead emphysematous. If, on the other hand, the fracture be compound, upon blowing the nose, the air rushes through the wound; so that in either case the nature of the accident may be easily ascertained.

Large portions of bone are sometimes detached from the skull, instead of being depressed; this was the case with a nobleman, now living, who met with a very severe blow upon his head, from which he has perfectly recovered.

Fractures of the skull, if unaccompanied with concussion or compression, become united, as fractures of the bones in any part of the body, although more slowly. Here is a specimen, where a circular, or rather oblong, piece of bone was, as you may perceive, completely separated from this part of the os parietale, by the cut of a sabre, and yet it became reunited. Fractures of the cranium, therefore, easily unite. Where, however, large holes are made through the skull, the apertures do not in general become filled with ossific matter, but by a tendinous structure, formed from the dura mater and united to the pericranium. The holes made by trephining are thus filled, and not by bone. Also, when in fractures of the skull, where the bones are separated to any distance, the interspace will not become filled by bony matter, but remain open, as you see in this skull, which had been fractured and the broken part widely separated.

The Treatment of Fractures of the Skull is as follows: when there is fracture, unaccompanied with symptoms of injured brain, you will not trephine; but you must, by the application of adhesive plaster, endeavour to heal the wound in the scalp as quickly as possible. Let your constitutional treatment be that of depletion, by means of blood-letting and purgatives. This plan removes symptoms of concussion, and even extravasation, which accompany these fractures; and often a few hours will show you that the application of the trephine, which you at first might have thought indispensable, is rendered unnecessary. It is wrong, therefore, to decide hastily in these accidents; for irreparable mischief might arise from your making an incision, and converting a fracture, which was simple, into one that is compound. Wait then for a time before you operate in such cases, for the purpose of seeing what effects may be produced by bleeding and purgatives. It not unfrequently happens, in these Hospitals, upon persons being brought in who have received injuries of the head, that the dresser in attendance will bleed them immediately after their admission, and send for the surgeon; before whose arrival the good effects of the loss of blood are apparent, and the symptoms of concussion, and even of extravasation, have lessened, so as to lead to a different view of the case. This shows how necessary it is that you should not be precipitate. If you act prudently, therefore, in these accidents, you will try bleeding and purgatives before you operate; and the depletion will

prove of the greatest possible advantage in preventing inflammation ; from which arises a principal danger.

Fracture with Depression.—The next subject to which I shall direct your attention is, fracture with depression. I will tell you what you ought to do in such cases, and leave you to act for yourselves.

Experiment.—In order to ascertain the symptoms arising from depression, I tried the following experiment : I applied the trephine to the cranium of a large dog, and took out a portion of bone. I then with the handle of a knife separated the dura mater from the bone ; for I found that I could make no impression on the brain until I had done so, and then pressed upon it with my finger. At first the animal did not seem to feel it ; but upon pressing more deeply, it produced pain and irritation, and he endeavoured to avoid it. Upon still increasing the pressure, he became comatose, and sunk on the table. I kept him in this state for five or six minutes : when, upon removing my finger, he got up, turned round two or three times from giddiness, and walked away apparently little worse for the operation. A gentleman who felt the animal's pulse during the continuance of the experiment, stated, that it became slower as the pressure was increased. In depression of the skull in man the pulse is the same—slow and labouring, and the breathing is often stertorous.

Apparent Depression.—After blows have been received upon the head, it often happens that upon examining the scalp, there appears to be depression of bone to a great extent, when, in reality, there is none. Let me put you on your guard here in this respect. A person receives a blow on the scalp : the parts immediately surrounding the spot where the blow was received swell from the extravasation of blood ; but at the part on which the blow directly fell, the cellular membrane, having been condensed by the injury, will not receive the extravasated blood ; thus the surrounding parts are considerably higher than the middle ; and the character of the contusion is certainly calculated to deceive those who are unacquainted with the nature of these accidents. I have several times seen these appearances ; but the first case which I recollect of it in my own practice was that of a child brought into Guy's who had received a severe blow on the head from a brick-bat. All present were prepared for the operation, fully expecting that I should apply the trephine ; for they felt convinced that there was considerable depression of bone ; and when I stated that I should not operate, they exclaimed, " Good God ! I wonder what can be his reason." This child, after having been freely bled and purged, in two or three days recovered, and the appearance of depression vanished.

I have often been sent for by my dressers to these cases, and have been requested to bring my instruments with me ; but upon examination have found that there was no depression of bone, and that the uneven appearance of the scalp was produced by the cause before mentioned.

It also very often happens in fracture of the cranium, that considerable depression of bone will happen from the external table of the

skull being driven into the diploe, without producing the slightest injury to the internal table : do not, therefore, be precipitate in your diagnosis, nor hastily determine upon performing an operation which you might afterwards have reason to repent ; these fractures, however, can only occur in those of a middle age ; for in the very young and in very old age, the skull is thin and without diploe. I believe in the course of my practice that I have frequently met with this accident ; and we have many preparations in the Museum which clearly demonstrate their true character ; but the three now before me are, I think, quite sufficient to satisfy your minds as to the existence of this state of the bone : here you see the external table has been driven in, and yet no vestige of fracture in the internal : here is another specimen, with greater depression ; and the third still more than either, yet the internal plate is sound. I am not acquainted with the histories of these specimens ; but it is evident that the persons recovered by the reunion that has occurred between the parts which were broken.

Suppose you are called to a patient who has had a severe blow on the head, and on examining the skull you find a portion of bone considerably depressed. You may still find this man capable of giving a history of the accident, and that his mind is not at all affected. On the other hand, you may be called to a person who has a fracture of the skull with depression, and who has lost the powers of his mind. If the fracture be simple, and there is no wound in the scalp, and no symptom of injury to the brain, it would be wrong to make an incision into the part, and perform the operation of trephining ; for by making such an incision, you add greatly to the danger of the patient, as you may make what was before a simple, a compound fracture, and consequently greatly increase the danger of inflammation, which rarely follows fracture with depression, where the fracture is simple ; but is a very frequent consequence of a compound fracture, which is produced by making an incision in the scalp. Never make an incision, therefore, when you can avoid it, or merely because there is a fracture with depression, if there be no symptoms of injury to the brain. Even if there be symptoms of injury to the brain, and the fracture be simple, do not immediately trepan. Take away blood, and purge your patient freely, and see how far the symptoms may be the result of concussion of the brain, and not of depression. If the symptoms do not yield to depletion, then, and not till then, perform the operation of trephining. I was called to a lady who had fallen against a projection in a wall, in walking across her parlour. The *os frontis* was driven in, but there were no symptoms of compression of the brain. I bled her, and guarded cautiously against inflammation, but there was no necessity for elevating the portion of the bone. This lady never had any symptoms of injury to the brain, and she recovered by depletion alone.

The old practice used to be, the moment an injury to the brain was suspected, and the least depression of the bone appeared, to make an incision into the scalp. This is putting the patient to considerable

hazard ; for the simple fracture would, by the incision, be rendered compound. In simple fracture, then, when it is attended with symptoms of injury to the brain, deplete before you trephine ; and when it is unattended with such symptoms, though there may be depression, deplete merely, and do not divide the scalp, unless the symptoms have not yielded to depletion. If the fracture be compound, the treatment must be very different ; because a compound fracture is followed very generally by inflammation of the brain ; and it will be of little use to trephine, when inflammation is once produced. It might be thought that it would be time enough to perform this operation when inflammation had appeared ; but this is not the case ; for if the inflammation comes on, the patient will generally die whether you trephine or not ; and you will not arrest its fatal progress by trephining, but the operation will add to the danger of increasing the inflammation. When inflammation of the dura mater and membranes of the brain has been excited by the depression of the bone, you scarcely retard the progress to death by performing the operation. These principles may be illustrated by many cases. In this Hospital I saw two instances : one in a patient of Mr. Cline, and another in a patient of Mr. Birch. Mr. Cline's patient was a man who had compound fracture from a blow on the head. A portion of bone had been depressed, and Mr. Cline advised him to submit to the operation of trephining. The man said, " You may do what you like ; I am no judge, but you are ; so do what you please with me." Accordingly he walked into the operating theatre to be trephined ; the portion of the bone was removed ; he walked back again to bed, and never had a bad symptom.* A short

* *Case*.—February 1823, John Mahoney, æt. 30, an Irish labourer, was brought into St. Thomas's Hospital, having been struck by the end of a bar of iron on his head : the blow stunned him for a few minutes. On examination, I found a compound fracture of the right parietal bone, a little above its centre, with depression of the fractured portion, in extent about the size of a crown piece, the greater part of which was below the inner table of the sound bone. The patient was perfectly sensible, and only complained of slight pain at the seat of the injury. He walked into the operating theatre, where I removed the whole of the depressed part of the bone, which was much comminuted. The dura mater was sound, and the hæmorrhage very trifling. After the operation he was freely purged, was ordered low, light diet, and kept very quiet, and merely cold water applied on linen to the wound. He rapidly recovered, without any bad symptom, and was discharged at the end of ten weeks, with the wound perfectly closed ; but the pulsation of the brain could be distinctly felt, as soft matter occupied the place of the bone which I had removed. During the progress of the cure he was only bled three times.

He wears a metal plate over the part at which the bone is deficient, but this is gradually becoming firmer, and the pulsation less distinct.

Case.—Timothy Desman, æt. 22, an Irish labourer, was admitted into St. Thomas's Hospital, Aug. 31, 1824. He had been struck with a hammer by accident on the superior part of the frontal bone to the left of the median line. The blow had produced a compound fracture, with depression, in extent about the size of a half-crown. He was perfectly sensible, and said he only felt a soreness at the injured part. I removed the whole of the fractured bone, which was comminuted ; one small portion had penetrated the dura mater. He has since been treated exactly as the former

time after, a patient under Mr. Birch, with fracture and depression, was told that he was in a similar danger, and advised to undergo the same operation. He was, however, self-willed, and obstinately refused to submit to the operation. Several days after the accident he was seized with pain in the head, and symptoms of inflammation in the brain; and when he became insensible, the operation of trephining was performed; but it did not arrest the symptoms, and he died of the inflammation. In Guy's Hospital two boys were admitted under very similar circumstances. The os frontis had, in one case, been broken by a kick from a horse, and in the other by a fall on the forehead. In one case the portion of bone was raised, and the boy did well: but the mother of the other boy interfered to prevent the operation of trephining; and though it was performed after symptoms of inflammation had appeared, he died. It is true, it happens, that fracture with depression is sometimes not followed by inflammation, even when the fracture is compound; but we cannot be certain of this; and if it ensue we cannot save the patient by trephining at a late period. The rule, therefore, which I always follow, is this: When I am called to a compound fracture, with depression, which is exposed to view, whether symptoms of injured brain exist or not, I generally use an elevator, and very rarely the trephine. I put this instrument under the bone, raise it, and if it has been comminuted, remove the small portions of bone. The elevation of the bone is not followed by any mischief; but if you do not raise it, and inflammation follows, it will be too late to attempt to save the life of the patient.

It sometimes happens, in fracture of the skull, attended with depression, that a small spicula of bone will project into the brain, so as to produce and support epileptic symptoms. A negro had received a blow on his head with a hammer. He was taken into St. Thomas's Hospital, having epileptic fits, and he had the appearance of a very slight depression on his head. Mr. Birch, whose patient he was, trephined him; and as he was raising the bone, which was effected with great difficulty, the man had a violent epileptic fit. The bone seemed attached to the dura mater, and upon looking upon the inner table of the portion which had been removed, a small thorn of bone projected from it, which pierced the dura mater, and which had been produced by the inflammation following the accident, which happened four years before the operation. The dura mater was thickened around the little process of bone. The man recovered, and had only one fit afterwards.

Mischief of Depression not immediate.—The mischief of depression is not, however, always immediate; the patient sometimes

patient was, and has not had a bad symptom since. (Sept. 20.) He has been bled twice.—T.

The appendix contains the following note:—

Since the case of Desman has been printed, symptoms of inflammation of the brain came on, in consequence of which he died. On examination of the head, a large abscess was found in the right hemisphere of the cerebrum.—T.

recovers from the first symptoms, but is thrown, by any hurried circulation, at a subsequent period, into a new train of effects, which still require surgical assistance ; and it is upon that account, if there were a wound, and I felt much depression, that I would immediately elevate the bone ; but if no wound, I would wait the production of symptoms.

In illustration, I shall mention some very interesting cases to which I wish particularly to call your attention.

Case.—Sir David Dundas was called to attend a person who, by a fall from a ladder (six weeks previous to Sir David's seeing him), had a fracture, with considerable depression of the skull. The patient had become insane, so that it was necessary to confine him by means of a straight waistcoat, and he had hemiplegia on the opposite side of the body to the seat of injury. So much time had elapsed from the accident, that the depressed portion of bone had become reunited to the cranium. Sir David immediately trephined him, taking away the depressed portion of bone. On the day following, his insanity was so far diminished, that the straight waistcoat was removed, as he did not require any further restraint. In a fortnight the hemiplegia disappeared, and all his unpleasant symptoms subsided.

Case.—Mr. T. æt. 31, a private in the Newbury Volunteer Cavalry, had been dining at Newbury with the troop, to celebrate the coronation of his present Majesty. When returning home at a late hour with some others of the troop, they were attacked by a number of the Queen's partizans, and during the affray which succeeded, Mr. T. received a violent blow from a brickbat on the superior part of the frontal bone, which caused a depression of a portion of the bone, and considerable hæmorrhage. Mr. Hemsted, surgeon, at Newbury, was sent for to attend him, and directed that he should be freely bled and purged ; which relieved him so much, that at the end of four days he returned home apparently well. Mr. Hemsted, however, told him he would be very fortunate if he felt no further inconvenience from the accident, and advised him to keep particularly quiet and sober.

On the 20th of January, 1822, exactly six months from the receipt of the injury, he had an epileptic fit ; Mr. H. was called to visit him, and recommended the same plan of treatment. The fits, however, returned once or twice every fortnight ; and oftener, if he exerted himself, or was guilty of any excess. Mr. H. told him, that he could not be cured without having the depressed portion of bone removed ; to which he was averse, and came to town to consult me, when I confirmed the opinion of Mr. H. The patient still refused to undergo any operation at that period. The fits increased in frequency ; and on the 30th of July, 1822, having had two, he became much alarmed, and sent for Mr. Hemsted to remove the portion of depressed bone, which Mr. H. did with a trephine. He speedily recovered from the operation, and has not since had any return of the epileptic fits.

Another circumstance I shall mention ; and whether we regard it in a physiological or surgical point of view, it is perhaps one of the

most extraordinary which ever occurred ; and as connected with surgery and physiology, I am surprised that it has not made a greater impression on the public mind than it appears to have done.

Case.—A man of the name of Jones was admitted under Mr. Cline, on the 9th of May, 1800, into St. Thomas's Hospital, from Deptford, where he had been seen by Mr. Nunn Davie, apprentice to Mr Chandler, who advised that he should be sent to the hospital. When he was brought to the hospital, and placed under the care of Mr. Cline, he was, in a great degree, destitute of sensation, and of voluntary motion ; his pulse was regular ; his fingers were in constant flexion and extension, nearly corresponding in frequency to his pulse. He had a depression near the superior edge of the left parietal bone. When hungry he was wont to grind his teeth ; when thirsty to suck his lips ; when he had occasion, or want to evacuate his fæces and urine, he moved about in his bed ; but he could sit in the chair, when he voided them. Mr. Cline trephined him, removing the depressed portion of bone, and he made a noise of complaint during the operation. The motion of his hands ceased during the operation, and the pupils of his eyes were directed forwards. At four o'clock that afternoon (the operation having been done at one) I found him raised in his bed ; and when I asked him if he was in pain, he put his hand to the wounded part of his head. The next day he could say, yes and no, but had still a stupor. He gradually recovered ; and when questioned as to the last thing which he remembered, it was taking a prize in the Mediterranean the year before ; and he was found in a state of insensibility in June, 1799 : so that he had lived a year unconscious of his existence. He was discharged cured from the Hospital, on the 10th of July. The exact mode in which his accident had happened I could not learn ; but he was found on board his ship in a state of insensibility, and was taken to Gibraltar, and to Deptford, in this state of deprivation of mental faculties and bodily power.*

It appears, therefore, that in cases of depression, we should not be prevented from trephining, however distant the period may be at which the accident occurred, if there be no inflammation ; and the patient may, after a great interval, be restored to the powers of body and mind.

* Mr. Cline may, perhaps, be able to add circumstances, which I have omitted in the relation of this case.

LECTURE XII.

ON WOUNDS OF THE BRAIN.

WOUNDS of the brain frequently happen without immediately producing any interruption to the operations of the mind. But should the wound be accompanied by either compression or concussion, then the particular symptoms which characterize those injuries will be present. If, however, the wound be a simple incision or laceration, it does not produce symptoms until inflammation succeeds. Indeed, considerable portions of the brain are lost, and yet the mental and bodily functions continue unimpaired. Epileptic fits and hemiplegia certainly sometimes directly follow such injuries; but, on the other hand, brain to a great extent has been lost, without considerable disturbance of either the mental or corporeal functions; numerous cases of this description are upon record; several have fallen under my own observation.

Case.—Mr. Davie, an apprentice of the late Mr. Chandler, came to me when I was in this Hospital, and said, “Look here, Sir,” at the same time showing me a portion of brain, with a piece of the pia mater attached to it. I went to see the man, and found the representation of Mr. Davie correct; there was a long transverse fracture in the os frontis, through which a portion of brain protruded. His mind was not at all affected; neither were the bodily powers in the least disturbed: no bad symptoms of any kind followed the injury; the wound healed most favourably by adhesion, and he was soon discharged from the hospital. About a year afterwards, while I was at the house of a lady in the city, whom I was attending, a man walked into the room, and said to me, “How do you do?” Not recollecting him, I looked at him with some surprise, when he informed me that he was the man whom I had seen before in St. Thomas’s Hospital, with a wound in the head, and through which he had lost some of his brain. He stated, that he had been quite well ever since; he had a depression at the part where he received the wound; was not subject to fits; and it was certain his mind had not sustained any decided injury from the accident, for he was at the time I saw him conductor of an extensive business.

It occasionally happens, when a portion of the brain has been lost, that a piece of the cranium will, by being driven in, occupy its place; and if in these cases no symptoms of compression manifest themselves, you must not elevate the depressed bone; for where you do so, you would, in all probability, give rise to extravasation, or increase the hazard of inflammation. The late Mr. Chandler had a patient in this Hospital who, on receiving a blow from a boat hook upon the parietal bone, had a portion of that bone driven into the brain, and at the

same time a quantity of the brain was lost ; at first there was hemiplegia. The depressed bone was permitted to remain, and the individual recovered.

Danger attending Wounds of the Brain.—The danger attending these injuries of the brain arises principally from two causes : viz., inflammation, and the formation of fungus. 1st, Inflammation ; and 2d, Fungus ; both of these may be conquered by prompt and scientific measures.

When the brain receives a wound, you must commence your curative exertions by abstracting as large a quantity of blood from the system as the constitution of your patient will bear ; not, however, to such an extent as to prevent the restorative operations of nature. Do not lower the system to such a degree as to prevent inflammation altogether, as was done by the dresser in the other Hospital, whose partiality for bleeding I mentioned to you. Though you succeed in keeping down inflammation, yet fungus will arise, and here is a preparation of the disease to which I allude. Sometimes wounds of the brain extend even to the ventricles, and you observe, that one of the lateral ventricles was opened by ulceration.

How restored.—Usually some days after the brain has been wounded, the divided parts begin to unite by the adhesive inflammation ; if this process cannot effect a cure, granulations form, which, at length, project through the opening of the skull, and give rise to the fungus before mentioned. Upon proper treatment the safety of your patient depends. If you do not repress the growth of the fungus, there will be violent constitutional irritation, and the life of the person will be destroyed : but, on the contrary, if you attend to the condition of the wound, and prevent the fungus from rising, you will succeed in effecting a cure.

Treatment of Fungus of the Brain.—The treatment is as follows. You are to apply to the fungus a piece of lint, wetted by liquor calcis ; and over this a strap of adhesive plaster ; when you examine the part on the following day, you will find the fungus considerably diminished ; you are then to use a thicker piece of lint, and the strapping as before ; pursuing this plan, you at length bring the fungus to a level with the scalp ; but this is not sufficiently low for your purpose ; therefore, you must proceed until you have succeeded in getting it on a level with the bone, in which position it must be cautiously preserved, when at last the scalp heals over it, and your object is accomplished. It is sometimes necessary to apply caustic to the fungus. I have witnessed several of these cases in our Hospitals. Formerly it was the practice in the treatment of these diseases to remove the bone contiguous to the fungus, and which, of course, rapidly increased until the patient became destroyed. The plan of treatment which I have just recommended to you is unquestionably the best ; viz., that of repressing the growth of the fungus until the scalp heals over it.

This will be well illustrated by the following cases.

Case.—John Dent, a boy, aged eleven years, on the 9th of December

1803, received a severe blow from the kick of a horse, on the anterior and inferior part of the right parietal bone, by which he was stunned. The same evening he was brought into St. Thomas's Hospital in a state of stupor, with a considerable tumour under the scalp. A longitudinal incision, to the length of two inches, was made, when immediately a portion of the brain made its escape, about the size of a small hazel nut; and upon introducing the finger, a fracture was distinctly felt, yet no depression was evident; but on the further division of the scalp in a transverse direction, and turning back the edges, a very considerable depression was distinguished; in consequence of which the trephine was applied, and one angular piece of bone removed by the metacarpal saw; also another piece, rather more than an inch in length, which was driven into the substance of the brain, was extracted with the forceps. During the operation, small quantities of brain were escaping continually with the blood: supposed to be about $\frac{3}{4}$ ij or $\frac{3}{4}$ iiss. Every depressed portion of bone being now sufficiently elevated, the wound was dressed superficially, and notwithstanding the great degree of stupor and insensibility he laboured under prior to the operation, his senses returned before Mr. Chandler (who operated) quitted the theatre, and from this time he appeared perfectly tranquil. The next morning he was ordered the common aperient medicine of the house, which was occasionally repeated. The wound was not dressed until the 4th day; when, upon the removal of the dressings, there appeared a disposition to fungus, arising from the brain, which continued to increase for about a fortnight: moderate degrees of pressure were had recourse to for its removal, but without success. Mr. Chandler then requested that the lint (with which it was previously dressed) should be dipped in lime water, and the same degree of pressure made use of as before. His plan had not been persisted in for more than ten days, before every particle of fungus disappeared; but it was observed, a short time afterwards, that the edges of the wound assumed a glossy appearance: they were, therefore, touched over slightly, every other morning, with the sulphas cupri, which occasioned the wound to contract daily, and by the latter end of February it was completely cicatrized: on account of losing so large a portion of bone, the brain could be distinctly seen pulsating through the scalp. He lost no blood from his arm during the cure, nor did there any bad symptoms occur.

Case.—George Freeman, aged eighteen years, was admitted into St. Thomas's Hospital, July 2d, 1811, under the care of Mr. Birch, having a fungous tumour arising from the brain. The history of the case was as follows: Seven weeks before, while he was grazing a horse near Tunbridge Wells, he fell asleep, during which time the horse (he supposes) trod upon his head; the blow rendered him senseless, and he remained in this state, till he was found by some men, and conveyed home. Immediately after the accident, May 20th, upon his being put to bed in a comatose state, he was bled largely from the arm; and in the evening, remaining in the same

state, also having a great deal of swelling on the scalp, the cupping glasses were applied, of which he was sensible.

On the following morning a crucial incision was made through the whole of the swelling, from which there issued a portion of blood and brain. A large piece of the os frontis had penetrated through the dura mater, nearly an inch into the substance of the brain ; which being removed, he became perfectly sensible when spoken to, and so continued ; but the fæces and urine passed away involuntarily. Every thing appeared to do well, until the fungus cerebri* made its appearance, and gave much trouble ; it was repeatedly cut away, and pressure applied ; which not only produced great pain in the head, but occasioned sickness and vomiting, which immediately ceased when the pressure was removed. About the 15th of June he lost his appetite, became very sick and faint upon the least exertion ; when the bark was given to him, and continued till he left the Wells.

When admitted into St. Thomas's Hospital there was a considerable loss of bone, on the os frontis, over the right eye, where the pulsation of the brain was evident. A fungous swelling, in a sloughy state, occupied the middle of the wound which was surrounded with red fleshy granulations ; and when the tumour was pressed on, he complained of severe headache, which ceased on removing the pressure. On the day following his admission I was desired to see him ; and I immediately cut away the projecting part of the fungus, and recommended pressure to be made on the part by means of a bandage, applying to the wound a pledget of lint, wetted with lime water. No other treatment was found necessary ; by these means the fungus was kept down, the ulcer gradually contracted, and on the ninth of August it was nearly skinned over, without one bad symptom occurring during the cure. He always complained of headache when the bandage was applied tight. He took no medicine while in the hospital.

Case.—Mr. Henry, jun. of Keswick, was struck on the forehead by a portion of a small brass cannon, which burst while he was firing it ; he was immediately after found in a senseless state, but was in a few minutes able to rise and speak. Mr. Edmondstone, surgeon, was called to see him, and arrived ten minutes after the accident ; he found a wound over the left eyebrow, which he enlarged, and then discovered a comminuted fracture of the skull ; the fractured portions of the bone were loose, and detached ; the dura matter was lacerated, so as to allow of the escape of about a tea-spoonful of the substance of the brain. The loose portions of the bone were removed, and the wound dressed. Soon after the operation he was sick ; and his pulse being hard, he was bled twice in the following night. On the next day some more brain in small quantity was removed with the dressing. A fortnight after the accident a fungus arose from the brain, which was treated by the pressure of lint dipped in lime water, which considerably repressed its growth. Whilst pursuing the above plan of treatment, he one

* These were exuberant granulations from the cerebrum.

day complained of severe pain in his neck, for which he was bled freely ; when in a few hours after, the fungus suddenly decreased, and soon entirely disappeared. The wound healed in fourteen weeks, and he has since remained well.

REMARKS.

I observed a circumstance in this young gentleman, after his cure, which shows the influence of mental excitement in agitating the brain, and in increasing, upon the instant, the quickness of its action. Something passed in conversation which displeased him ; and his brain, which could be distinctly seen beating through the opening in his skull, immediately quickened from 80 to 120 in the minute: struck with this appearance, I watched it for a few minutes, and as his mind became calm, the pulsation gradually sunk again to about 80. He had a great dislike to and apprehension of the finger being applied to the injured part ; and as soon as I touched it he receded from me, and I saw his brain beating with extraordinary velocity. These circumstances strongly impress a conviction of the influence of mental and corporeal excitement, and of the necessity which exists of guarding against the one and the other.

ON INFLAMMATION OF THE BRAIN.

I shall now speak more particularly of the inflammation which follows injuries of the brain, in which their chief danger consists.

Symptoms of Inflammation.—Upon the first approach of inflammation, the person complains of great pain in the head, very quickly falls into a comatose state, and when roused from this condition the pain is excessive ; the scalp around the external wound becomes œdematous ; and if you press upon it, the impression of the finger is retained ; the surface of the wound has a shining glossy appearance, and from the wound itself is discharged a fluid, of a sanious colour ; the edges of the wound have a sloughy appearance ; the countenance is very much flushed, the eyes are red, the skin is hot, and the carotid arteries beat with very great force : so much so, that if the collar of the shirt be open, you can see the pulsation of these arteries at some distance from the bed ; this circumstance of itself would be quite sufficient to convince you that there was a great determination of blood to the brain. Next the patient is seized with rigors, and these follow in very quick succession ; hemiplegia often attends, and is generally situated on the opposite side of the body to that of injury to the brain. Violent convulsions of that side of the body occasionally occur ; the patient remains in a comatose state, but when roused will give (until towards the very close of life) rational answers to such questions as may be put to him. These, then, are the ordinary symptoms of inflammation of the brain arising from wounds of that organ.

Formation of Matter and its Situation.—If the inflammation terminates in suppuration, the matter will be situated, either between the dura mater and skull, pia mater and tunica arachnoides, pia mater and surface of the brain; or, lastly, in the brain itself.

Between the Skull and Dura Mater.—When pus is situated between the dura mater and skull, trephining for its removal is attended with success; but it is comparatively rarely there, as it is generally situated between the pia mater and surface of the brain, for which an operation will be useless.

Another situation in which matter has been found is in the longitudinal sinus of the dura mater.

Case.—Mrs. P. aged twenty-two, was admitted into St. Thomas's Hospital, on the 23d of June, on account of an affection of the head. Sixteen months previous to her coming to the Hospital, she had received a blow on the forehead from falling against a chest of drawers. This caused a small wound, with considerable contusion, which soon disappeared by the application of a spirituous lotion; but still she had some pain and a sense of weight in the head: this increased, and at the end of eight months was extremely severe, and she had epileptic fits. She was shortly afterwards much relieved by a discharge of a purulent character from the nose and ears, which continued three days, when it subsided, and the symptoms again became as violent as ever, but were again diminished by a second similar discharge; this occurred repeatedly, but she did not experience any permanent relief, as the symptoms always returned when the morbid secretion stopped. Having tried numerous remedies without procuring ease, she applied at St. Thomas's Hospital, and was admitted under the care of Dr. Blane,* and received so much benefit from the treatment he adopted (which consisted of blisters and opiates chiefly) as to be able in six or eight weeks to quit the Hospital. Shortly after her dismissal, however, the old train of symptoms re-appeared as violently as before, and she came into the hospital a second time, when she entirely lost her appetite, was very thirsty, had most distressing pain in her head; she slept but little, was extremely restless and irritable, so much so that any sudden disturbance caused convulsions: the pain was chiefly confined to the part on which she had received the blow, and pressure on this spot gave rise to great uneasiness. The former plan of treatment was adopted without affording her any relief, and she evidently got worse, being at times quite comatose. A crucial incision was made into the scalp by Mr. Birch, to ascertain if any disease of the pericranium or bone existed, but not any was discovered. When this wound began to discharge, the symptoms were, in a degree, relieved. The discharge was, at first, healthy; but after a short period became fœtid; the pericranium separated, and exposed a carious state of the subjacent bone. She continued in this state for a considerable time, when it was discovered that some pus escaped through a carious opening in the bone, which was evidently

* Now Sir Gilbert Blane, Bart.

influenced by the pulsations of the brain : the trephine was, therefore, applied, and a portion of bone raised to allow of a more ready escape for the pus ; little appeared, but the dura mater was found highly inflamed, and had a gangrenous hue. After the operation she got worse, and expired early the next morning, about nineteen months after the receipt of the injury.

DISSECTION.

The dura mater opposite the wound was in a sloughy state, and on opening the longitudinal sinus a long abscess was found, which contained about two drachms of matter. The brain itself appeared sound.

This is the only example of the kind I have witnessed.

Between the Pia Mater and Brain.—The next part in which matter is situated is between the tunica arachnoides, pia mater, and brain itself. This last is the usual place, and in this case the matter is diffused over the hemispheres of the brain, in the same manner as I mentioned to you the other evening blood is, when extravasated on that organ. When the matter is seated between the pia mater and brain, it will be of no use to open the dura mater, as very little will be discharged, there being no communication between one part and another ; for the matter is contained between the vessels which pass from the pia mater and brain.

Case.—December 23d, 1815. A driver, belonging to the royal artillery, was kicked on the forehead by a horse, and was taken up perfectly insensible. On examination, a wound was found, with considerable fracture and depression of the frontal bone, immediately above its sinuses. He was taken to the General Hospital, where the surgeon on duty, after enlarging the wound to ascertain the extent of injury, raised the depressed portions of bone, and removed several which were completely detached ; the dura mater was lacerated, and some small portion of brain escaped during the operation. In the evening he appeared tranquil, and his bowels were freely open. 24th : Had passed a quiet night, was sensible, and felt comfortable. Purgatives ordered. He continued to go on well for several days. On the 28th, a fungus of the brain protruded through the wound, and gradually increased. On the 2d of January, he complained of pain in his head, and moaned a good deal. 4th. The fungus having protruded more, a consultation was held, and it was determined that a ligature should be applied to its base, as pressure produced immediate loss of sensation. The portion of brain removed by the ligature was of a dark colour : very slight hæmorrhage followed. On the 6th, another ligature was applied, and on the following night a considerable bleeding occurred. The fungus continued to protrude in spite of the ligatures : he became insensible ; slept continually ; did not take notice when roused, and gradually sunk, expiring the morning of the 14th.

DISSECTION.

Some portion of the inner table of the frontal bone was depressed; a quantity of pus was situated beneath the dura mater, near the seat of injury. The fracture extended through the petrous portion of the temporal bone to the foramen lacerum. The right hemisphere of the cerebrum was in a soft state, and appeared to have been lacerated. Another collection of pus was found under the longitudinal sinus of the dura mater.

In the Substance of the Brain.—The next situation in which matter is found is in the substance of the brain itself. It is lodged in various parts, and the only circumstance very curious in this complaint is, that you would not suppose, from the symptoms, that matter was forming; they are those of compression rather than irritation. If the membranes of the brain be attacked with inflammation, symptoms of irritation will be present; but if the brain itself, they will be those of compression; and the circumstance which surprises a person who examines the brain of an individual, in which matter has been formed, is, that so little constitutional irritation existed during its formation.

Case.—Mary Harris, æt 16, was admitted into Guy's Hospital, under the care of Dr. Marcet, having a constant severe pain in her head, which she referred chiefly to its fore part:—three months before she had fallen down a staircase and struck her head. She was quite sensible, and her intellectual faculties were unimpaired. She mostly kept her bed; was inclined to be comatose, but could be easily roused; had no appetite or thirst, and the attempt to take food frequently occasioned vomiting. Some time after her admission into the Hospital, she died suddenly, being much convulsed, and her breathing stertorous for two hours preceding her death.

DISSECTION.

Two abscesses were found in the right lobe of the cerebellum, one containing about 3ij the other 3ss of matter. Some slight serous effusion existed between the pia mater and tunica arachnoides. The dura mater adhered very firmly, and appeared more vascular than usual.

Case.—A boy, 13 years of age, fell from a scaffold, on which he was playing and fractured the left parietal bone. On examination it was found, that not only a fracture of considerable extent existed, but also that portions of bone were driven through the membrane into the substance of the brain. The trephine was immediately applied, and as many portions of the depressed bone were removed as could be readily found. The brain was found much lacerated, and there was a partial loss of motion on the opposite side of the body. The patient was now put to bed, and continued for seven days without any bad symptoms, except the loss of motion on the right side of the body. He

rested well, and his appetite was good. On the eighth day, however, the loss of motion on the right side of the body became complete; but at the same time there were very painful sensations in it. He was often supplicating the nurse to rub his arm: he began to lose his appetite: his pulse became quick and weak; and fungous granulations were observed to sprout from the wound, from which there was also a considerable discharge. His appetite continued bad for some time, and his pulse was quick and weak; but then these symptoms vanished, giving way to appearances which indicated less danger; that is, his appetite returned; his pulse became fuller; he did not complain so much of pain in the right side of the body. These favourable symptoms were but of short duration; but although he became more irritable, he remained perfectly sensible. The symptoms continued thus alternating for the space of a month, sometimes giving hopes of recovery, at others producing apprehensions of a speedy dissolution. At length his pulse became exceedingly quick, and so weak as to be scarcely perceptible: the discharge was more considerable: the fungus sloughed, and another formed; and within two days of five weeks after the accident, he expired.

DISSECTION.

The dura mater was found to adhere to the left hemisphere, in which a considerable opening was found, leading into a large cavity: at the superior part of this cavity was situated a detached portion of bone. This cavity was an abscess, which probably had been formed from the irritation of the portion of bone; it extended downwards into the ventricles, which it had ulcerated, and which were found very much distended with pus. The opening of communication between the ventricles was much dilated; the surface of the brain, through every part, had considerable marks of inflammation, and purulent matter had been effused between the folds of the pia mater.

There is a curious specimen in the collection, taken from a child which I had under my care, and on whom I performed the operation of trephining. A young child was playing in a yard where there were some fowls feeding, when it received a wound on the head from the beak of a cock. The mother, hearing the child shriek, ran to the spot, and found that there was a small wound of the scalp, and, thinking there was no serious injury, she bound it up; but, a week afterwards, pain in the head came on, together with great constitutional irritation, and the child was brought to me. On examining the head, I found that a circular wound had been made in the bone, and that matter issued through the opening, I said to the mother, If the child is not better to-morrow, bring it to me, and I will make a more free opening for the discharge of the matter. The next day the child was brought to my house, and I performed the operation of trephining, when I found there was an opening in the dura mater and pia mater corresponding to that in the bone; the symptoms of irritation were relieved by the operation, those of compression still continued, and in three

days the child died. On examining the part after death, I found there was a circular wound in the dura mater, the edges of which were hardened and thickened, and as you see in the preparation, a similar wound of the pia mater and brain, in size corresponding to the external opening, and an abscess between the pia mater and brain. At that time I had no idea that a wound of the description I have just mentioned could be produced by a bird of this size; but since that period I have seen an instance of a similar kind; an Indian pheasant made a dart at a child, which was playing near it as it fed, and struck a hole into the superior maxillary bone, just below the orbit.

I shall mention two more cases of wounded brain, which are extremely curious and interesting.

Case.—Master C. W., aged twelve years, received a wound on the left temple from a slug, about the size of a pea, which was discharged from a spring gun. He bled profusely, vomited, and was inclined to stupor; but on being roused, appeared aware of the persons about him: his pulse was small and tremulous; his countenance swollen and pallid; and the skin bedewed with a cold moisture. On being undressed, he made free use of his limbs in extricating himself from his clothes; but in a few hours after, all the symptoms of compression came on; for which purgatives, bleeding, blisters, and cold applications were had recourse to. Two days after he became paralytic on the right side, when the wound was enlarged to ascertain the extent of injury; an opening was found in the temporal bone, just above the zygoma, and a portion of brain appeared at the aperture, about the size of a large pea; but there being no depression, the wound was closed, and the former remedies persevered in. By degrees the coma and other symptoms subsided, and although the intellectual energy may be said to be quite recovered, yet the paralysis continues.

Previous to the accident, the young gentleman had suffered severely from enteritis, followed by glandular enlargement and suppuration. Perhaps, to the weakened state of his health at the time of the injury, together with the large quantity of blood he lost in the first instance, and the active treatment subsequently persevered in, is to be attributed the favourable termination of this case, where a foreign body had entered, and in all probability is still lodged in the substance of the brain.

Case.—Mr. Thompson was admitted into St. Thomas's Hospital, at two o'clock on Friday afternoon, having been wounded in the head by a pistol shot. The left temporal bone was fractured, and there was a wound in the scalp over the parietal bone; but no communication could be discovered between it and the wound over the temporal bone. Mr. Travers shortly after saw the patient, and found it necessary to dilate the wound; to enable him to raise the depressed bone, of which he removed five portions. There was a considerable bleeding from beneath the bone, but the dura mater appeared uninjured. The wound was dressed, and the patient ordered to be kept quiet. There was some oozing of blood from the left ear; and the patient, although con-

fused and agitated, gave rational answers to any questions put to him. At five o'clock he took some castor oil, but immediately brought it up again, and vomited repeatedly after. About half-past nine he suddenly jumped out of bed, and complained bitterly of the restraint put upon him ; but was again placed in bed. At ten he complained of thirst, and called incessantly for water ; two hours after, his pulse having become quick and hard, he was bled from the arm ; this was done with much difficulty, as he resisted powerfully : in less than two hours the pulse could scarcely be felt at the wrist, his extremities were cold, his pupils dilated, and his breathing stertorous. At two o'clock he again became almost unmanageable, and coma appeared to be rapidly increasing ; but he still answered questions rationally, when roused : he now dosed until four o'clock, but was very restless ; at which time some hæmorrhage took place from the wound, and he was quite insensible. His pulse became very feeble and hurried, his pupils dilated and quite insensible to light, and he continued in a state of torpor until twelve o'clock ; when, contrary to all expectation, he again in a degree rallied ; his pulse rose, the body became hot, and he was excessively restless ; half an hour after he had several convulsive fits, and then became so composed as to take a cup of tea ; but again suddenly relapsed into a state of stupor. About two o'clock he had some more convulsions, foaming at the mouth, and making frequent exclamations ; he became so violent that the straight waistcoat was applied ; this continued until five o'clock, when he became more quiet and perspired profusely ; he then gradually got weaker, had subsultus tendinum, and the right side was paralysed ; subsequently he had strabismus, the countenance was horridly distorted, and he occasionally struggled violently ; a frothy mucus was discharged from the mouth and nostrils, the pupils became very much contracted and fixed, and at half-past two o'clock he expired.

DISSECTION.

The fracture extended from the temporal bone in one direction into the orbit, in another to the sagittal suture, and in a third to the mastoid process ; several loose portions of bone were found on the dura mater, which was discovered to be lacerated. On raising the upper part of the cranium, a quantity of soft brain issued from the wound. The dura mater was much inflamed, particularly on the left side and posterior part. Under the dura mater was a collection of dark-coloured serum, and a layer of extravasated blood over the left hemisphere. The substance of the brain, on being cut into, exhibited numerous red points. The ball was found in the anterior part of the middle lobe of the left hemisphere, the brain around it was soft and of a dark colour. The vessels, in all parts of the brain and its membranes, were extremely turgid.

Time at which Inflammation occurs.—The time at which inflammation of the brain supervenes, after the injury has been received, is generally about a week, rarely less than that time; and this it was that led me to say, on another occasion, that inflammation of the brain was more slow in its occurrence than that of most other organs. It often happens that inflammation of the brain does not come on till a fortnight or even three weeks after the injury. Every surgeon who has written on the subject puts his reader on his guard about the distance of time that complaint supervenes after the accident; he tells you the patient is not safe till two or three weeks afterwards. If you read the works of Mr. Pott on the injuries of the head, you will find the circumstance mentioned; and in the work of Mr. Dease, of Dublin, it is distinctly stated, that inflammation of the brain is occasionally postponed to three or four weeks after the accident occurs, and even then the patient is not safe.

Case.—I will give you a case relating to this subject. Dr. Babington and myself were sent for to see a person, a clerk to the firm of Whitbread and Co., who, whilst riding on horseback, (being a short-sighted man) struck himself violently against the bough of a tree, and was brought to the ground by the force of the blow. He was taken to Croyden, where Dr. B. and myself visited him. We found that he had been struck on the *os frontis*, just above the frontal sinuses, where there was a depression; and this was the first case in which I witnessed emphysema of the forehead produced by blowing the nose. We took all possible care of the patient, bled him, regulated his diet, &c., till the inflammation had subsided. He came to town three weeks after the accident; and about three months afterwards, he asked whether he might go to Rochester to spend a little time with some friends; we told him that he might, if he would pay attention to himself, keep his bowels open, and regulate his diet. After the lapse of a few days, he became extremely ill with inflammation of the brain, and he died. On inquiry, we found that he had neglected the directions given him, and allowed his bowels to be costive.

The following case also shows the necessity of keeping the patient from any exertion.

Case.—On the 8th of June, the son of Mr. J. S. fell from a ladder on some spikes, one of which penetrated his skull. The wound bled freely, and a considerable portion of the substance of the brain came away, also several portions of bone, when the wound was enlarged to ascertain the extent of injury: he was insensible at times for several days after the accident. On the 27th, he walked a mile to the house of his medical attendant, Mr. Bethune, of Brighton, and appeared in a very favourable state for recovery. He had been particularly cautioned as to the necessity of his refraining from all kinds of exertion. On his return home, his brothers were playing at cricket, when he imprudently and unfortunately joined them. Inflammation of the brain was the consequence, of which he died in two days.

It always requires great care when there is considerable depression

remaining after an accident ; and I will mention to you an instance of this kind, which will show you the necessity of enjoining a patient in this state strict attention to his mode of living. A man, who had received a wound in the head from a pistol shot, came to this Hospital : the wound healed kindly, but the depression remained. Whenever this man indulged even in the moderate use of spirituous liquors, he used to have violent pain in the head, which was only relieved by blood-letting.

Treatment of Inflammation of the Brain.—As to the treatment of inflammation of the brain, it is the same as is required for inflammation in general ; with this exception only, that the blood should be drawn from the temporal artery in adults, and the jugular vein in children : by these means you abstract blood more readily from the part ; even in adults you may, after opening the temporal artery, if the symptoms be not relieved, bleed from the jugular vein. In addition to this treatment, you purge, produce perspiration, and apply blisters to the head. I have seen poultices applied to the scalp, containing stimulating applications, of considerable use. The patient is to abstain from every species of stimulus.

OF THE OPERATION OF TREPHINING.

This operation will be required under the following circumstances.

1st. Where there is extravasation of blood between the dura mater and skull.

2d. In fractures of the skull, with symptoms of compression continuing after depletion.

3d. In simple fractures with depression and continued symptoms of compression.

4th. In compound fracture with depression, unattended with symptoms of compression, it is best to trephine, or to raise the depressed bone by the elevator.

5th. When matter has formed.

It generally happens in these last cases, when matter is seated between the dura mater and skull, that there is fracture ; and this is an indication of the seat of the injury which has been done to the brain ; it is also followed by rigors and other symptoms, which indicate its presence ; still it would be right, in cases in which there is no fracture, and the other symptoms, rigors, &c., are present, to penetrate the bone, to see whether matter is lodged between it and the dura mater. When an abscess is placed beneath the dura mater, I have never seen a case recover from trephining for it, although that membrane has been opened for its discharge.*

* If the dura mater be punctured, the pia mater should be punctured also, as adhesion will more readily occur.

The operation of trephining used to be of the most complicated kind, requiring several instruments; to learn the names and use of which was of itself a study. It is now simple, and few instruments are necessary. Three will be quite sufficient; viz., a knife with a double edge, in order to separate the pericranium from the bone; an elevator; and a trephine, having a crown; and a pin which will allow of being moved with facility.

Parts on which the Trephine must not be applied.—There are several parts of the skull on which the trephine should not be applied. First, you should never place it on the median line, which extends from above the nose to the tuberosity of the occiput, on account of the intimate connexion between the dura mater and bone; as well as to avoid the longitudinal sinus on the fore and upper part, and the perpendicular ridge of the occipital bone at the posterior portion. Over the frontal sinuses the trephine could not be used with any effect. There are two other points which it is necessary to avoid: the anterior inferior angle, and the posterior inferior angle of the parietal bone; the first on account of the artery of the dura mater, which penetrates there the parietal bone; and under the second, the lateral sinus is situated. If depression occurs at any of these points, the trephine must be applied at a little distance.

Elevator to be used alone, if possible.—Fractured portions of bone may be often raised by the elevator, and I may observe here, that this is the instrument I recommend in cases in which it can be employed without the use of the trephine.

Hey's Saw.—The saw which Mr. Hey has recommended may be useful in removing an angle of bone, to admit the elevator.

Mode of performing the Operation.—The mode of trephining is as follows: you are called to a case, in which there is a wound of the scalp, with fracture and depression of the bone; you introduce your finger into the wound, in order to ascertain the extent of the depression. If, necessary, you then enlarge the wound, in the direction of the fracture; and if the depression be extensive, you should make a crucial incision, and turn aside the integuments from the part at which you intend to apply the trephine, cut through the pericranium, and separate it from that part of the bone on which the crown of the trephine will act. The pin of the trephine is to be pushed down, and placed on the sound bone, as near to its fractured edge as it can with safety; by this means the portion of bone removed will be in size very little more than that of half of the circle of the instrument. As soon as the teeth of the trephine have entered the bone, and made sufficient way to prevent the instrument from slipping, the pin is to be raised, and the sawing continued. I never saw the pin do any mischief; but my nephew once witnessed an operation in which it perforated the dura mater, the surgeon having forgotten to raise it. When using the saw, let your bearing on it be as equal as possible, and the motion such as the radius will permit, the ulna being fixed: as you proceed in the operation you must frequently introduce a probe into the groove made by the saw, to ascer-

tain how far you have proceeded. In operating on persons of middle age, you may know that you are more than half through by the bleeding which takes place when the diploe is wounded; but in very young or old persons, in whose skulls little or no diploe exists, a few turns of the saw are sufficient to penetrate both tables of the cranium. When you have sawn through at one part, introduce the elevator, separate the remaining part, and raise the bone which may be easily accomplished, and will prevent the danger of wounding the dura mater.

Danger of the Operation.—Some surgeons say, that this is a trifling operation, and not difficult to perform; but they would deceive you; it is one of the most dangerous operations in surgery: whilst performing it, there is but a thin web between the instrument and the brain; cut through this, and destruction of life will generally be the consequence. Mr. Hunter thought that when the dura mater was wounded the person scarcely ever recovered; which opinion, though not exactly borne out by the cases which have since occurred, show the impression made on the mind of a man who was so great an observer of nature. It is certain, that there is less danger when the dura mater and pia mater are both wounded, than where the dura mater alone is injured. I will tell you the reason: in the former case, where both the dura mater and pia mater are wounded, the brain immediately projects and fills the wound. If I were to pass quicksilver through an opening in the dura mater, where would it go? into the lower part of the spine, between the tunica arachnoides and the dura mater; inflammation of the dura mater spreads over the whole cavity, as erysipelas does over the surface of the body; whereas, in the first kind of injury, fungous granulations will project through the opening, which would easily close by the process of adhesion. I have seen many instances where the dura mater and pia mater have been wounded, and the patients recover; but few where the dura mater has been wounded alone.

Treatment after the Operation.—After trephining, the elevator should be introduced to raise the depressed bone, and thus return it to its natural situation. You see there is no necessity to operate where there is any additional risk, because an operation in a part where there is no such risk, can be as well performed, and the elevator be introduced under the depressed bone. The scalp is to be returned over the opening, and the poultice should be applied, which, I believe, is the application most congenial with the feelings, and most conducive to the safety of the patient.

If there be a necessity for taking away more than one portion of bone, the same plan is to be pursued in each operation.

OF WOUNDS ON THE SCALP.

Dangerous.—Wounds of the scalp are not devoid of danger; and I have known several instances in which apparently slight injuries of that part have destroyed life. Incised wounds are certainly less liable

to produce deleterious effects than the lacerated or contused ; although I knew a lady, of high consequence in the country, die from the removal of an encysted tumour in the scalp.

Cause of Danger.—The cause of the danger attending such wounds is the free communication by blood-vessels between the scalp and dura mater ; as the vessels of the pericranium freely anastomose with those of the dura mater through the diploe of the skull, and, therefore, inflammation lighted up in the one, is readily extending its influence to the other. There cannot be, therefore, a more absurd and injudicious practice than that of wantonly making incisions through the scalp, to ascertain the exact extent of injury which the bone may have received, when there are no symptoms to justify such a procedure ; because such incisions produce new dangers to the patient, as well as add to that which the injury would itself produce. If, therefore, I am called to a case of injury of the head, in which there is apparent depression of the skull, yet there are no symptoms of injury of the brain, I would not render that fracture compound by making an incision through the scalp ; and even if there were symptoms of injury of the brain, I would try the effect of free depletion, before I made an incision, as the loss of blood sometimes occasions the entire removal of the symptoms ; but if there were already a wound in the scalp, and my finger passed down to a depressed portion of bone, I would immediately use an elevator to raise it, which may be generally done in children without difficulty, and in the adult would saw off a portion of bone to admit the elevator.

Mode in which they Destroy Life.—The modes in which wounds of the scalp prove destructive to life are threefold : first, by producing what is called an erysipelatous inflammation on the head ; secondly, by producing extensive suppuration under the tendon of the occipito frontalis ; thirdly, by rendering a simple fracture compound, they produce a more extended inflammation of the dura mater. With respect to the first of these, the following case of it is frequent. A man comes to the Hospital, and shows a wound of the scalp, which he has received, perhaps, in some drunken affray ; a slight dressing is applied to the wound, and the case is considered as too slight for admission ; in a few days the man returns with the scalp excessively tumid, and of a florid red colour, and he requests admission ; his face soon becomes swollen, his eyes are closed by the tumefaction of his eyelids, and he has a high degree of constitutional irritation : in a day or two I have seen him in a low muttering delirium ; he then becomes comatose, and dies with symptoms of compressed brain. Several of these cases have been examined, one more particularly by my former apprentice, Mr. Callaway, who found that there was great effusion in the scalp, between the occipito frontalis and pericranium, and also between the tunica arachnoides and pia mater. Although this inflammation is said to be erysipelas, and is treated as that disease by giving bark, and other tonics, yet I believe both its cause and its treatment are mistaken : as far as I am able to judge, it is the result of tendinous inflammation of the

occipito frontalis, extending from thence to the skin of the head and neck, and that its treatment should be rather evacuant than repleting, as the danger results from the extension of inflammation to the membranes of the brain.

The second mode in which wounds of the scalp produce deleterious effects, is by exciting suppuration under the tendon of the occipito frontalis : such abscesses should be opened early, to prevent the matter extending over a large surface of the skull.

The third mode in which wounds of the scalp prove destructive, is by incisions being made to trace fractures of the skull, producing in this way great aggravation of the inflammation, and extending its influence to the membranes of the brain. An incision in the scalp should, therefore, be never made but in cases of imperious necessity.

LECTURE XIII.

ON INJURIES OF THE SPINE.

THE effects which arise from violence done to the spine, are very similar to those which are produced by injuries to the head ; for example—concussion—extravasation—fracture—fracture with depression—suppuration and ulceration.

ON CONCUSSION OF THE SPINAL MARROW.

Effects of.—When a person receives a severe blow upon the spine, or, from any great violence, has it suddenly bent, a paralysis of the parts below will frequently succeed, in a degree proportioned to the severity of the injury ; and after such an event the person sometimes gradually recovers the motion and sensation of the paralyzed parts.

Treatment.—If the part be tender to the touch, or the patient complains of pain, blood should be taken away, near to the part injured, by cupping or leeches, and the bowels should be kept freely open. After a week or ten days, if the patient be not much relieved, a blister should be applied, and the surface be afterwards dressed with equal parts of the unguent: lyttæ and cerat: sabinæ. The extremities should be frequently rubbed with a liniment of a slightly stimulating nature ; and as sensation returns, electricity or galvanism may be beneficially employed.

Case.—A man was admitted into Guy's Hospital (under the care of Dr. Curry) who had received a severe blow from a piece of wood

falling upon his loins. When he was brought into the Hospital, his lower extremities were in a great degree deprived of motion, and their sensation was much diminished. When resting on his back in bed, he could with much difficulty draw up his legs, but could not bend them at a right angle with his body ; and a considerable time elapsed before he could make the muscles of his lower extremities obey the efforts of his will. As there was still the appearance of severe contusion and much deep-seated tenderness at the injured part, blood was repeatedly taken away by cupping, and his bowels were kept freely open by calomel and saline medicines. When the pain and tenderness had been removed, a blister was applied, and a discharge kept up from the surface for three weeks. The liniment: ammoniæ was rubbed on the extremities. In six weeks the motion and sensation of the limbs had nearly returned, when he was submitted to the influence of electricity. By this treatment, in ten weeks, he got perfectly well.

OF EXTRAVASATION.

Of effusion of blood into the spinal canal, I have seen but very few examples : one I recollect witnessing in St. Thomas's Hospital. A man had received a severe blow upon the dorsal vertebræ, which produced complete paralysis of the lower extremities, and shortly after his admission into the Hospital he died. Upon examination after death, slight extravasation was found in the spinal canal.

Case.—I was consulted about a very interesting case which was under the care of Mr. Heaviside ; the particulars of which were as follow : A young gentleman was swinging, when some of his companions caught him by the neck with a rope, during the time that the swing was in rapid motion ; by which the whole of the cervical portion of the spine was violently strained. As, however, the line slipped immediately off, he thought but little of it. Subsequently to the accident, for some months, he was not aware of any pain or inconvenience ; but his school-fellows observed that he was less active than usual ; instead of filling up his time by play, he would be lying on the school forms, or leaning upon a stile or gate, when in the fields. From this time he continued to decline, both in strength and power. He was brought to London for advice about the middle of May. His complaints were occasional pains in his head, which were more severe and frequent about the part and neck, extending down the back. The muscles at the posterior part of the head and neck were stiff, indurated, and very tender to external pressure : he felt pain in moving his head or neck in any direction ; added to these symptoms, there was a great deficiency in the voluntary powers of motion, especially in the limbs.

Two setons were placed in the neck, and he took various medicines, without experiencing any benefit. His complaints, especially the paralytic affection of his limbs, got much worse ; besides which, he felt

an extremely painful sensation of burning in the loins. In a short time this was succeeded by a sense of extreme coldness in the same part. The pulse and heat were natural.

A consultation of Dr. Baillie, Dr. Pemberton, Mr. Heaviside, and myself, was held, and the application of mercury was determined on. The pilul: hydrarg: was taken for a few days: but as it produced violent action upon the bowels, mercurial frictions were consequently employed. He felt his limbs getting every day weaker, but his neck was more free from pain when moved, and he was more capable of moving it by his own natural efforts.

On the 7th of June his respiration became laborious; all his symptoms rapidly increased, and on the following day he expired.

EXAMINATION.

The whole contents of his head were carefully examined, and appeared perfectly healthy; but upon sawing out the posterior parts of the cervical vertebræ, the theca vertebralis was found overflowed with blood, which had been effused between the theca and the enclosing canal of bone. The dissection being further prosecuted, this effusion was found to extend from the first vertebra of the neck to the second vertebra of the loins, both included.

The preparation, which is in the Museum of Mr. Heaviside, only shows a small portion of the effused blood, which had become coagulated on the theca; as much of it, being fluid, escaped during the examination.

FRACTURE WITH DISPLACEMENT.

The separation of one vertebra from another is of very rare occurrence without fracture; and the supposed dislocations of the spine are, in a very large majority of cases, fractures with displacement. When this happens, the parts of the body situated below the seat of injury become paralysed. Thus, if it occur in the lumbar vertebræ, the person immediately loses all power of motion and sensation in his lower extremities, his fæces pass off involuntarily, the action of the sphincter ani being destroyed; and his urine is retained, the bladder being unable to contract.

Of the Dorsal.—When the dorsal vertebræ are the seat of this injury, all those parts situated below the fracture are paralysed as in the former case; but in addition, the abdomen becomes distended with air, which escapes into the intestines in consequence of the diminished powers of the part; this gradually subsides after the patient's bowels have been freely opened.

Of the lower Cervical.—If the fracture with displacement takes place in any of the cervical vertebræ below the fourth, the same symptoms occur in the body and lower extremities as when the dorsal

vertebræ are injured ; and there is also a partial paralysis of the upper extremities, but seldom such as to deprive the patient of all motion and sensation.

Of the upper Cervical.—When it happens above the fourth cervical vertebra, the person generally dies on the instant ; because the diaphragm is paralysed, which is the only agent in supporting respiration after such injury of the lower vertebræ of the neck ; but when the fracture with displacement is above the origin of the phrenic nerve, the diaphragm loses its power, and dissolution almost immediately results.

Period of Termination.—Patients rarely recover from these injuries to any part of the spine, but the period at which life is destroyed varies according to the seat and violence of the accident.

From Injury to the Lumbar Vertebra.—In the loins, if the displacement be considerable, the person may die in three weeks : but if slight, the patient may survive many weeks. I recollect a case in which the patient lived two years after a supposed fracture with displacement of the lumbar vertebræ ; but the precise nature of the injury was uncertain, as the friends would not permit any examination of the body after death, by which alone the extent of the mischief could have been decidedly ascertained.

To the Dorsal.—The patient usually survives a much shorter period when the dorsal vertebræ are injured : although I have known a gentleman live nine months after such an accident to this part, which was occasioned by his horse falling, and rolling upon him, after leaping over a wide and deep road, to which he came unawares whilst riding at speed.

To the lower Cervical.—After the occurrence of such injury between the fourth and seventh cervical vertebræ, the patient seldom lives longer than four or five days, and in some cases dies within eight-and-forty hours after the accident.

Fracture without Displacement.—Fracture of a vertebræ may take place without displacement ; a curious instance of which occurred in the cervical vertebræ, at the time I lived with Mr. Cline, the particulars of which were as follow :

Case.—A girl received a severe blow upon her neck ; after which it was observed, that whenever she wanted to look at any object, either above or below her, she always supported her head with her hands, and then gradually and carefully elevated or depressed it, according as she wished, towards the object. After any sudden shock she used to run to a table, and placing her hands under her chin, rested them against the table until the agitation occasioned by the concussion had subsided. Twelve months after the accident the child died ; and on examination after death Mr. Cline found a transverse fracture of the atlas, but no displacement. When the head was depressed or elevated, the dentiform process of the second vertebræ became displaced, carrying with it a portion of the atlas, occasioning pressure upon the spinal marrow, which was also produced by any violent agitation.

Treatment.—In the treatment of fractures of the spine, with displacement, no plan, hitherto adopted, has been productive of any permanent benefit.

Mr. Cline's Operation.—Mr. Henry Cline, who was an excellent anatomist, and a very good surgeon, first attempted to afford relief by operation after this accident, as he thought that cases of this kind should be treated as those of fracture with depression of the skull; and he had made numerous experiments, the result of which gave him reason to suppose that such an operation might be successful. He cut down upon the spine, at the part where the displacement was evident, and having exposed the spinous process and arch of the injured vertebræ, he sawed through the arch near to the transverse process with a small trephine of his own invention, and then raising the depressed portion of bone, he thus took off the pressure from the spinal marrow.

It is well known that union of bone has taken place after fracture with slight displacement of the vertebræ. Mr. Brooks has a preparation showing a union of this kind; and in the Museum at the College of Surgeons is another portion of spine, presented by Mr. Herald, of Cheshunt, in which union has been produced after an accident of this nature. There can be no fear then as to the restoration of the part, if the pressure on the spinal marrow could be removed.

In many cases of fracture with displacement of the spine, the spinal marrow is either partially or completely torn through. In such instances little good could result from an operation; but in others the spinal marrow is apparently but little injured; and in such cases it was, that Mr. Cline thought there might be hope from an operation. Mr. Tyrrell has performed the operation since Mr. Cline, but both cases terminated fatally :*—whether future trials will be more successful,

* As this case has been published in a foreign work, with some inaccuracies, I take this opportunity of giving a correct detail of it.

John Buckley, aged twenty-five, a labouring man, about the middle size, and of rather spare habit, was brought into St. Thomas's Hospital, on the evening of Tuesday, the 15th of October, 1822, having received some injury to the spine, which was occasioned by his slipping at the time he was carrying a heavy load of cast metal: he fell about five feet, but was not aware that the metal struck him. The accident had happened early in the morning of the 13th, since which time his urine and fæces had passed off involuntarily. I saw him a few hours after his admission into the Hospital, and, on examination, found that he had lost all sensation and power of motion, below Poupart's ligament anteriorly, and the lumbar vertebræ posteriorly; in fact, the superior edge of the pelvis marked accurately the line between the sensitive and the non-sensitive parts. The spinous process of the twelfth dorsal vertebra was depressed, and he complained of acute pain when this part was touched. The temperature of all parts was equal. He had not passed any urine since his admission, but at night he complained of its accumulation giving him inconvenience, when it was drawn off. 16th. He was much the same in every respect; in the afternoon, my colleague (Mr. Green) was kind enough to see him with me; when we decided that an operation, similar to that performed by Mr. H. Cline, might probably be beneficial; but as our consultation was late in the day, and the operation likely to be very tedious, I deferred it until the next morning. 17th. No improvement or abatement of any of the symptoms: at half past ten o'clock he was taken into the operating theatre on his bed, being placed with his face downwards, and some pillows under the lower part of the abdomen, in order to elevate that portion of

it is difficult to say ; we cannot speak decidedly on this subject, as the first operations have been unsuccessful. The proposal is laudable, and

the spinal column which had been injured. My colleagues (Messrs. Travers and Green) being present, I performed the following operation. An incision, about six inches in length, was made through the integuments, in the direction of the spinous processes, having that of the last dorsal vertebra in the middle, over the point of which was observed some slight extravasation of blood. The muscles were then separated by the scalpel, from the sides of the spinous processes, and from the arches of the twelfth dorsal and first lumbar vertebræ, as far as the transverse processes, also partially from those above and below. During this separation some arterial hæmorrhage occurred, which was very troublesome in obstructing my view of the parts ; but it was not very copious. An assistant then held aside the integuments and muscles with a broad bent piece of iron, so as to allow of the application of a small trephine on the arch of the first lumbar vertebra. After using the trephine for some time ineffectually, I cut away the spinous process of the vertebræ with a chain saw, which enabled me to see much better the operation of the trephine ; and finding that I made very little progress with it, I took, instead of it, one of Hey's small saws, with which I sawed nearly through the arch, close to the transverse process ; and after having done the same on the other side, I soon succeeded in removing the larger part of the arch with a pair of strong tooth forceps, leaving but a thin portion, covering the canal. The arch of the twelfth dorsal (over which the extravasation had been observed) was distinctly found to be loose : I then proceeded to remove it, as I had done the former, which I soon effected completely, so as to expose the ligamentum subflavum : this was found divided : on elevating it, the dura mater covering of the cord was seen quite perfect, and apparently free from injury. I then removed the portion of the arch of the first lumbar, which I mentioned as having left, together with the ligament, exposing near two inches of the sheath of the cord, which appeared healthy ; and under which the pulsations of the cord could be seen. The patient could now feel distinctly, on being pinched inside the thigh ; which immediate return of sensation was beyond my most sanguine expectations. The edges of the wound were brought together by two sutures, dressed lightly with strips of adhesive plaster, and the patient removed to his ward, on the same bed, and in the same position.

I am much indebted to my colleague, Mr. Green, for his assistance, and am happy in having this opportunity of publicly thanking him for his kindness, not only in this instance, but many others in which I have had occasion to ask his advice or assistance. The operation occupied nearly an hour and a half, during which time the patient scarcely uttered a complaint. More patience is required in the performance of this operation than skill ; as it is extremely tedious, and requires much care in using the saw : also in elevating the bone from the canal. The trephine is of no use ; the scalpel, Hey's saw, and the forceps, are all the instruments required, with the piece of bent iron to hold aside the muscles. Mr. H. Cline used this last instrument, which answers the purpose much better than the fingers of an assistant could do, and is much less in the way.

Soon after being placed in his ward, he took thirty drops of the tincture of opium, as he expressed a wish for something to make him sleep. I saw him again at three o'clock, when he said he felt very comfortable ; but did not appear to have more sensation than when removed to his ward after the operation ; he had not slept, in consequence of which the tincture of opium was to be repeated in the evening.—Being engaged out of town, I did not see him again until about one o'clock in the morning of the 18th : he was perfectly easy ; had slept, and felt me pinch his toes ; a very considerable oozing had taken place from the wound, more of a serous than sanguineous nature ; his pulse was feeble ; in consequence of which I directed him to take weak wine and water, when thirsty. Ten o'clock. Had slept comfortably since I quitted him ; serous discharge still continues from the wound, which looks healthy ; the edges in several parts adhering ; pulse still weak ; ordered his wine and water to be made stronger. One o'clock. Complained of his bladder being

the operation is not severe, nor does it increase the danger of the patient; time and experiment can only determine its value. If we

distended, when I introduced a flexible catheter, and drew off about a quart of high-coloured urine. The catheter was allowed to remain in the urethra, and I desired that the bladder might be kept empty, by frequently taking out the plug and letting the urine flow off. Eight o'clock. Very easy; had passed but little urine since; pulse had got up considerably, but was soft and regular. Not having passed any *fæces* since the operation, I ordered an injection of common salt and barley water (the *enema com.* of the Hospital) to be thrown up; he felt it pass, and it was retained: wine and water to be weakened. 19th. Ten o'clock. Had slept well; pulse good; wound looking very healthy; slight suppuration; sensation more general and distinct; had not had any motion or return of the injection, in consequence of which I directed him to take four grains of calomel and a scruple of rhubarb immediately. His position (which had not been altered since the operation) being uneasy, I had him turned a little on one side, propping him well with pillows. His urine had been frequently allowed to flow off; but much had not passed. Eight o'clock. Very comfortable; pulse rather full; to omit his wine. 20th. Slept well; pulse good; sensation more distinct; wound looking well, with rather more suppuration; his position changed to the other side; has not had any motion; enema to be repeated, with the addition of an ounce of castor oil. 21st. Bowels freely open, but the passage of the *fæces* involuntary, although he could tell when they passed. He had not slept quite so well, on account of the nurse having loaded him with bed clothes, which occasioned very copious perspiration; pulse good: wound healthy: sensation improving: during the night, a considerable quantity of urine escaped into the bed, in consequence of the nurse having taken the plug from the catheter; it was extremely ammoniacal, and caused excoriation in two or three places about the thighs; a dry sheet was drawn under him, and powdered chalk applied to the excoriations. 22d. Slept well, but again perspired profusely; pulse weak; wound healthy; rather more excoriation: to take some diluted nitric acid, and to eat a small quantity of meat; position occasionally changed from side to side; sensation gradually increasing. 23d. Slept tolerably, perspired but very little, was rather restless; pulse good; wound healthy; the urine loaded with mucus; in consequence of which I directed that he should omit the acid, and take some liquor potassæ, with a few drops of tincture of opium, three or four times in the day. Hitherto he had been lying on his abdomen, and now and then turned a little to either side; this position was very uncomfortable to him, and the pressure on the excoriated parts very painful; I therefore ordered a clean bed to be made up, with the addition of two long soft pillows, which were placed lengthways on the bed, under the sheet, leaving a space between them; he was then carefully moved into it, and placed on his back, with the spine in the space between the pillows: he expressed much relief from this alteration, which did not occasion the slightest inconvenience. 24th. Slept well, and had turned a little to the side in the night; wound healthy; pulse good; discharge of mucus with the urine less in quantity. The catheter had been withdrawn the evening before; and, during the night, he had passed small quantities of urine of his own accord; but there is still a dribbling: he also feels distinctly the passage of the *fæces*, but cannot retain them. The liquor potassæ had been given him in the night, undiluted; by which his mouth was burnt, and he objected to take any more. I, therefore, ordered a mixture of carbonate of soda, carbonate of magnesia, and mucilage, to be taken two or three times a day instead. Sensation pretty distinct to the toes. 25th. Had not slept very well; pulse good; and wound healthy; quantity of mucus in the urine larger: to take soda water. At eleven o'clock in the evening I was sent for, in consequence of his complaining of pain in the region of the bladder. His countenance was rather anxious, and he was very restless; the pain was confined to the region of the bladder; the abdomen flaccid; and the bowels freely open. The catheter had been passed, by which a considerable quantity of mucus was drawn

could save one life in a hundred by it, we should deserve well of mankind ; and if any good does ultimately result from it, Mr. Henry Cline has the merit of proposing it.—*Palmam qui meruit ferat.*

off—this had relieved him a good deal ; pulse not in the least hard or thready ; to foment the lower part of the abdomen, and to take thirty drops of opium every four hours ; some mucilage, alkali, and opium, to be injected into the bladder. 26th. Had slept at intervals ; pulse pretty good ; wound healthy ; urine not so much loaded with mucus ; still considerable pain at the lower part of the abdomen. Leeches to be applied immediately ; the fomentation continued, and opium to be taken every four hours. 27th. Had been relieved by the application of the leeches, which I ordered to be repeated, as he still complained of pain. Slept a little ; much anxiety of countenance : urine still loaded with mucus, and tinged with blood ; pulse rather quick, but soft. The fomentation to be continued ; bowels freely open ; the pain in the region of the bladder increased a little in the evening, when I again ordered the leeches, and constant fomentation. 28th. Appeared much better ; had slept well, and had very little pain in the abdomen, which was considerably distended, but not tense, or painful on being pressed ; wound looking healthy ; pulse much the same as yesterday ; urine not so much loaded with mucus, but still tinged with blood ; much troubled with flatulence : in the evening he was much the same. 29th. Had slept tolerably for a few hours after I saw him ; but early in the morning awoke with pain in the stomach, and immediately began to vomit ; the vomiting continued almost incessantly until I arrived at the Hospital in the morning, when it abated a little ; but he still continued at intervals to throw up quantities of a dark green bilious-looking fluid, the same as he had ejected from the first ; it was not frothy, nor had it a fetid or sour smell : I ordered him to take the effervescent mixture, (subcarb. of potash, mint water, and lemon juice,) with ten drops of tincture of opium, every half hour, and waited to see the effect : after taking two doses, he became much more tranquil, and went to sleep, in which state I left him. The vomiting returned occasionally during the day, but was always relieved by the effervescent mixture. In the night he was very restless ; and on one occasion, when the nurse quitted his bed-side for a few moments, he nearly got out of bed, and was only prevented by her return ; towards morning he became more quiet, but was evidently sinking, and he died about six o'clock on the 30th, having been perfectly sensible until within a short time of his death.

The attempt to get out of bed is mentioned by Mr. Charles Bell as a common circumstance in the termination of fatal cases of injury to the spine, therefore cannot be regarded as any proof of recovery of motion from the operation.

DISSECTION.

I inspected the body between three and four o'clock the same day, and the following is an account of the appearances :

On opening the cavity of the abdomen a quantity of air escaped, which had little smell ; the peritoneal covering of the parietes adhered slightly to the ilium and cæcum on the right side of the pelvis, but was otherwise quite healthy ; a small quantity of dark coloured fluid in the cavity of the pelvis. The liver, pancreas, and spleen, quite healthy. The stomach, viewed externally, appeared sound ; but on opening it, the vessels of its mucous surface were found much injected with red particles, which I considered the effect of long-continued vomiting, not of inflammation. The folds of the small intestines immediately in contact with the bladder, and on the right side of the pelvis, near the cæcum, adhered together, but more particularly near the bladder ; on removing them, the bladder was exposed, much thickened, and of a bluish tint : I passed a catheter, with a view of keeping it from the pubis, that I might remove it more easily ; but with a little pressure, the instrument broke through its parietes ; when removed, the whole of its coats were found to be in a morbid state, but more particularly the mucous one, which was much thickened, and its internal surface very rough, much as I have seen it in patients who have

OF SUPPURATION AND ULCERATION OF THE SPINAL MARROW.

The only case in which I have had an opportunity of ascertaining this disease by dissection, was the following :

suffered a length of time from irregular stone in the bladder: as it was altogether pulpy, and easily broken down. The alteration of structure extended to the membranous part of the urethra. The kidneys and ureters were perfectly healthy; nor was there any other diseased appearance either in the abdominal or thoracic viscera. The fracture of the body of the vertebræ was not discovered, until the vessels, &c, covering it, had been removed. The surface of the wound made in the operation was sloughy, but this did not extend deeper than the newly formed matter. There was a deposition of lymph externally on that portion of the dura matral covering, which had been exposed in the operation, as may be seen by the preparation of the parts, which are preserved in the collection at St. Thomas's Hospital; but both it and the spinal cord itself were otherwise apparently in a sound and healthy state.

REMARKS.

All attempts which have as yet been made to relieve patients suffering from injury to the spinal column, by operation, have proved unsuccessful; but, I think, under such circumstances, that, instead of deterring others from undertaking similar operations, they rather tend to encourage them in the performance.

When the above case occurred, I was not aware that any one, excepting Mr. Henry Cline, had performed this operation; but I have lately received some account of a case in which Mr. W. Wickham, junior, of Winchester, operated about six years ago; and I understood that Mr. Attenburrow, of Nottingham, has also performed an operation of a similar nature; but I have not been able to procure any particulars of the case.

The patient upon whom Mr. Wickham operated, had received a severe blow upon the back and lower part of the neck, causing fracture with displacement of the seventh cervical vertebra. The body and the inferior extremities were completely paralyzed, and there was also partial affection of the superior extremities. Mr. Wickham did not see the patient until several days after the accident; and had not therefore an opportunity of performing the operation sooner than the eighth day subsequent to its occurrence, at which period he did it more from the earnest solicitations of the patient and his friends, than from any conviction of its being likely to prove beneficial.

The operation was easily performed, and the patient was in a degree relieved by it; his breathing became more free, and sensation returned to a considerable extent, but he died on the second day after the operation.

Mr. Wickham (to whom I feel much indebted for these particulars) informs me, that the benefit afforded by the operation, even at the late period at which it was performed in this case, was such as to induce him to think much more favourably of the probable result of a similar operation, performed at an earlier period after the injury, than he did before the occurrence of the above case.

The friends of the patient would not permit Mr. Wickham to examine the injured parts after death, so that he was not able to ascertain the precise extent of mischief.

In Mr. Henry Cline's case the spinal marrow and its membranes had been completely torn through, so that a favourable termination could not be expected.

My patient died of inflammation of his bladder, occasioned by the irritation of the urine, which, I believe, might have been prevented; and I should have taken steps for that purpose had I then known some circumstances, of which I have since been informed, connected with Mr. Cline's experiments relative to injuries of the spine. He invariably found, that when complete paraplegia was produced by the injury which he inflicted on the spinal marrow of dogs, that the bladder became affected

Case.—A gentleman, who resided about eight miles from London, had, by a fall, received a severe blow on his spine, which did not, however, produce any immediate ill effect. Some time after, having been much exposed to changes of weather, he was suddenly seized with pain in his back, which was followed by paraplegia, retention of urine, and involuntary discharge of fæces. I was requested to see him on account of the retention of urine, and attended him for a length of time for the purpose of using the catheter. For several weeks his symptoms remained unchanged, except the appearance of a troublesome sore on the nates. Towards the close of his existence, he complained of much uneasiness and distention at the upper part of his abdomen. His appetite failed, he rejected his food, and he had a great deal of fever, with quick pulse and profuse perspiration—he sunk gradually.

DISSECTION.

Upon opening the spinal sheath, a milky fluid was found within it, just above the cauda equina; and higher up, about three inches, the spinal marrow was ulcerated to a considerable depth, and was in that softened state which the brain assumes when it is rendered semifluid by putrefaction. All the other parts of the body were healthy, excepting the bladder, which was considerably inflamed.

TREATMENT.

In a case like this, it will be required to take precautions to prevent inflammation, by cupping or leeches; subsequently, counter irritation, by blisters or tartar emetic, will be useful: issues or setons may also, in some cases, prove beneficial.

from the action of the urine on its mucous coat. This organ having lost its nervous power, it appears that the urine becomes decomposed in it, as it does after it is voided in the usual manner, and it then acts as an irritant on the mucous surface; this might probably be obviated by frequently emptying the bladder by means of a syringe, and by injecting a mucilaginous fluid to protect the mucous coat.

The immediate, although partial, return of sensation in my patient, and the after gradual increase of feeling, are proofs that the operation was in a degree serviceable. The patient also lived long enough to show that the effects of the operation upon the parts immediately concerned in it, are not sufficient to afford any ground for objection to its performance.

Every surgeon knows what the termination of these cases without operation always is; therefore why not attempt to save the patient by an operation, easy in its performance, and not in itself productive of any serious mischief?—T.

LECTURE XIV.

ON ANEURISM.

Definition.—An aneurism is a pulsating tumour communicating with the interior of the heart, or of an artery, and containing blood.

External and Internal.—When an aneurism is seated in one of the extremities, or upon any superficial artery, it is generally called external; when situated upon any of the arteries of the cavities, as the abdomen or thorax, it is termed internal. In the first case, there is usually but little difficulty in ascertaining the nature of the disease; in the latter case, however, much obscurity often exists, rendering the diagnosis extremely doubtful.

Three Stages of external Aneurism.—In the formation of external aneurisms, three stages may be observed. At first, a small tumour is perceived, which pulsates very strongly; it then contains only fluid blood, and may be easily emptied by pressing upon the artery which supplies it, between the swelling and the heart, thus stopping the flow of blood into the sac. When in this stage, the patient does not experience much pain or inconvenience; sometimes he is attacked with cramp or spasmodic contractions of the muscles of the limb below the aneurism, more particularly when undressing to go to bed.

In the second stage, the tumour is larger and more solid, and the sac cannot be completely emptied as in the former case. The blood has in part coagulated in the interior of the sac, and its parietes have become much thickened. The size of the swelling, and its pressure on the surrounding parts, now creates pain, and retards the circulation. The pulsation is still distinct, but not so violent as in the first stage.

In the third stage, the size of the aneurism is still further augmented, and it requires much more solidity. The pulsation is very indistinct, and only to be felt at that part of the tumour which is opposite to the orifice of the artery. The sac is now almost filled by layers of fibrous matter, and contains but a very small quantity of fluid blood. The patient experiences much severe pain, and great inconvenience in moving the limb, particularly if the aneurism be seated near a joint; the extreme parts of the limb become œdematous, from the pressure of the tumour impeding the functions of the veins and absorbent vessels; sensation is also diminished from pressure on the nerves.

Mode in which Life is destroyed.—After this the aneurism continues slowly to increase; the integument over it becomes of a dark colour; inflammation of the cutis takes place, and the cuticle is partially separated by the formation of vesicles. A gangrenous spot next appears, and in a short time an eschar is formed and separates, by

which the sac is opened ; some blood immediately escapes, but rarely in sufficient quantity to destroy life. The patient sinks from the repeated loss of blood, much more frequently than from one copious hæmorrhage.

At first, the opening into the aneurismal sac is small, and the bleeding which takes place usually slight, being easily stopped by pressure upon the wound ; but as the sloughing process proceeds, the opening becomes enlarged, and the hæmorrhage returns, and thus, by the repeated loss of blood, the life of the patient is destroyed. Sometimes an aneurism commencing internally, but breaking externally, causes death in the same way, as for instance, an aneurism in the thorax ; but when it opens internally, the patient frequently dies instantaneously.

Sometimes destroy Life suddenly.—I have, however, known the bursting of an external aneurism cause immediate loss of life. A man had an aneurism in the groin, which burst on his making an attempt to throw off his bed clothes and to raise himself in bed, and he died in a few moments.

Not always destructive.—An aneurism does not always prove destructive to life, although no operation be performed for its cure. I have seen gangrene of the foot and lower part of the leg produced by a popliteal aneurism ; the gangrenous parts separated, and the patient recovered.

Internal Aneurism.—I shall now describe internal aneurisms, which differ in some respects from the external.

ANEURISM OF THE HEART.

An aneurism of the heart consists of a sac formed externally to the parietes of that organ, but having an opening in it, which communicates with the interior of one of the cavities. It is a very rare disease, and I have only seen three specimens of it ; for the dilatations of the ventricles, which are not uncommon, and which are frequently called aneurisms, are not really so. We have two preparations of this disease in the Museum at St. Thomas's Hospital.

Case.—One of the cases, in which I had an opportunity of seeing the disease, was under the care of Mr. Palmer, assistant surgeon in the army. A soldier belonging to the regiment to which Mr. Palmer was attached, received a severe flogging, and during the punishment he held his breath ; he shortly after this complained of a violent pain in the chest, which was quickly followed by ascites and œdema of his inferior extremities. He died suddenly, and upon inspecting his body after death, Mr. Palmer found, that an aneurism which had been formed on the left ventricle, had burst into the cavity of the pleura on the left side.

Case.—Another case occurred under Mr. Postlethwaite, of Chichester. The patient had symptoms of organic disease of his heart, with ascites and œdema, as in the former case. The man died sud-

denly, and an aneurism of the left auricle was found on examining his body. The aneurism was of the size of a large walnut, and a quantity of blood was effused between the coats of the auricle.

ANEURISM OF THE ASCENDING AORTA.

The commencement of the aorta, just where it is covered by the pericardium, is not an uncommon seat of aneurism. We have some preparations in the Museum at St. Thomas's Hospital, showing the disease situated at this part. In one of these specimens the aneurism had burst into the pericardium, which was found filled with blood. The history of the patient from whom this aneurism was taken, may be useful, in order to make you cautious in such cases.

Case.—A man who had been admitted into Guy's Hospital, under my care, having a popliteal aneurism, was taken into the operating theatre, for the purpose of having a ligature put upon his femoral artery. He was placed upon a table in the proper position, and I had commenced the operation, when he stretched himself on his back, and I perceived his urine flowing from him. This, I said, is something more than common apprehension, or expression of pain ; I took out a lancet, and opened a vein in his arm, but the blood did not flow : I then tried to bleed him from the jugular vein ; he gave a deep gasp, and in a few minutes was dead. The next day I opened the body in the presence of the pupils, when I found the pericardium distended with blood, which escaped from an opening in an aneurism seated at the beginning of the aorta, immediately above the semilunar valves. If I had finished the operation, I might have had the credit of killing this patient.

You should be particularly careful not to perform an operation for an aneurism, until you are satisfied that no others exist, as it often happens that many aneurisms form in several parts of the same individual at once. Mr. Cline was about to operate upon a man in St. Thomas's Hospital, who had a popliteal aneurism, but deferred it on account of the patient's complaining of pain in his abdomen. A few days afterwards the man died suddenly, and, on examination, an aneurism was found between the two emulgent arteries, which had burst into the abdomen.

Aneurism producing Absorption of Bone, &c.—Absorption of part of the sternum and of the cartilages of the ribs, sometimes takes place from the pressure of an aneurismal sac, situated between the heart and curvature of the aorta. We have a preparation in which three of the cartilages of the ribs, and a considerable portion of the sternum have been thus destroyed.

Progress of this Aneurism.—An aneurism seated on this part of the aorta, at first usually presses upon the lung, producing oppression in breathing and cough, and is, at this stage, often confounded with dyspnœa arising from other causes : but as the disease increases, the upper part of the chest becomes enlarged, and a pulsation may be dis-

tinctly felt by pressing on the intercostal spaces. The cartilages of the ribs are then absorbed, and subsequently a portion of the pectoral muscle; inflammation is produced in the integument; an eschar forms in the centre of that inflammation, and as the eschar gradually separates, the patient loses his life from hæmorrhage.

Life may be prolonged.—In these cases the life of the patient may be often prolonged, even after bleeding has commenced, by coating the wound, and forming an artificial sac; and two or three weeks may be thus added to life, and enable the patient to prepare for that “borne from which no traveller returns.”

Case.—A woman was admitted into Guy's Hospital, having an aneurism of the ascending aorta. The skin became inflamed, an eschar formed and in part separated, so as to allow of the escape of a quantity of blood; the hæmorrhage stopped in consequence of a coagulum plugging up the orifice, and the wound was more completely closed, by the application of some lint, confined by plasters and bandages: no further bleeding occurred, but the patient died twenty-seven days after the first hæmorrhage, and in consequence of inflammation of the aneurismal sac, and of the aorta.

ANEURISM OF THE CURVATURE OF THE AORTA.

These aneurisms project just above the sternum, and they destroy life in different modes; sometimes bursting externally, as in the former examples, sometimes occasioning death by their pressure. I have an example, given me by Mr. Davis, formerly surgeon of the Custom House, in which death was produced by its bursting into the trachea. The man was rising from his bed, when he was seized with cough, immediately expectorated blood, and died in a few minutes from suffocation and loss of blood. Upon dissection, an ulcerated opening about the eighth of an inch in diameter was found in the trachea from the aneurismal bag.

Sometimes resemble Carotid Aneurism.—Aneurisms beginning from the curvature of the aorta, sometimes rise to the middle of the neck, and assume the appearance of carotid aneurism. A specimen was given me by Mr. Dyson, surgeon, of Fore Street, who sent to me to say, that he had a carotid aneurism under his care, which he wished me to examine. I found a tumour in the side of the neck, but thought I could trace a small swelling from it to the sternum, and, therefore, refused to operate. The patient lived seven months, and Mr. Dyson gave me the aneurism which sprang from the curvature of the aorta: a large bag was formed in the neck, communicating by a narrow canal with the curvature of the aorta.

Case.—Mr. Allan Burns, formerly a most excellent surgeon and anatomist at Glasgow, wrote to me respecting a pulsating tumour above the clavicle, upon which it was proposed to perform the operation of aneurism. In my answer, I said, ‘Take care that the case which you described is not an aneurism of the aorta. The operation was not per-

formed; the patient died of the disease, which proved, upon dissection, to be an aneurism of the aorta. This case is mentioned in Mr. Burns's excellent work on the anatomy of the neck.

Produce Suffocation.—Aneurisms of the curvature of the aorta sometimes destroy, by their pressure on the trachea producing suffocation; sometimes they occasion great difficulty in swallowing, by their pressure on the œsophagus: and when seated at the lower part of the curvature, they now and then appear at the back between the scapulæ.

ANEURISM OF THE ARTERIA INNOMINATA.

This case will rarely allow of an operation. Here is a specimen of it, and you will see that there is scarcely any space between the aneurism and the aorta; and I think it one of the most difficult operations in surgery. My friend, Dr. Mott, of New York, is the only person who has had the intrepidity to put a ligature on this vessel; the patient, for a time, appeared to be doing well, but ultimately did not recover.

ANEURISM OF THE DESCENDING AORTA WITHIN THE THORAX.

Of the aorta in the posterior mediastinum, I have seen three small aneurisms. When they become large, they sometimes burst into the œsophagus. I have an excellent preparation given me by Mr. Armiger, in which you may see a large aneurismal bag with an ulcerated opening into the œsophagus. The patient died from profuse vomiting of blood. In the morbid collection at Guy's Hospital, you may see a similar specimen taken from a patient of Mr. Foster's, who not only vomited blood, but passed a considerable quantity by stool.

ANEURISM OF THE ABDOMINAL AORTA.

When an aneurism is seated above the cæliac artery its pulsation may be distinctly felt at the scrobiculis cordis: and the pressure of the swelling on the upper curvature of the stomach produces so frequent an inclination to vomit, that the patient is under the necessity of observing extreme abstinence, to keep the stomach in a quiescent state.

Bursting into an Intestine.—When the aneurism is seated lower down, and on the fore part of the aorta, it sometimes bursts into an intestine. Dr. Scudamore brought a gentleman to my house, who had a pulsating tumour just above the umbilicus. A few weeks afterwards I was sent for to this gentleman at Henley, who had been seized with fainting, and a discharge of blood by stool: he revived a little, but on the following morning the discharge of blood returned, and he died suddenly: in the aneurism which I removed from him, you may see

that the jejunum had adhered to the fore part of the aneurismal bag, and that the sac had ulcerated into the intestine.

Producing absorption of the Vertebrae.—When the aneurism arises from the posterior part of the aorta in the abdomen, it presses upon the spine, and produces absorption of the vertebrae: it then proceeds until it appears between the last rib and spine of the ilium in the loins. In a specimen taken from a patient in the other Hospital, by Mr. Howden, the aneurism projected into each loin. As the aneurism, when it appears in the loins, and has acquired any magnitude, does not in general pulsate, you must be upon your guard that you do not mistake it for lumbar abscess, a circumstance I once saw happen. A surgeon, in a hasty way, said, "This is a lumbar abscess," and plunged a lancet into it, and then with something of a similar exclamation, he said, "God bless me! this is blood;" a piece of adhesive plaster was applied covered by a roller, and the wound healed, and the patient afterwards died of the bursting of the aneurism internally.

Appearing at the Ischiatic Notch.—I have seen an aneurism seated in the cavity of the pelvis pass through the ischiatic notch under the gluteus maximus muscle, where it produced a large pulsating tumour, which I at first thought was an aneurism of the gluteal artery; but feeling apprehensive that it might have some communication with the vessels of the interior of the pelvis, I would not operate; and the patient, before he died, had an hæmorrhage from his bladder, which showed that the aneurism was seated within the pelvis, and that it had protruded into the ischiatic notch.

OF THE SIZE OF ANEURISMS.

The aneurism given me by Mr. Howden is the largest I have ever seen; it began from the posterior part of the aorta by the emulgent arteries; on the one side it passed into the loins, and it there contained many pounds of blood; on the other side it first projected into the loin in the situation of the left kidney; it then descended over the psoas muscle under the sigmoid flexion of the colon, and terminated on the brim of the pelvis.

OF THE NUMBER OF ANEURISMS IN THE SAME INDIVIDUAL.

The greatest number of aneurisms which I have seen in the same person is seven: an Irish labourer came into the other Hospital, with an aneurism at the origin of the arteria profunda, and another in the femoral artery, near the middle of the thigh. I tied the external iliac artery above Poupart's ligament, and the man, sometime afterwards, died of an aneurism at the bifurcation of the aorta, which burst into the cavity of the abdomen: I injected the limb, in which you have an opportunity of seeing beautifully the anastomosis of the iliac artery,

with the vessels of the thigh. Upon examination of this man's body, an aneurism was found in each ham; one at the bifurcation of the aorta, one at the origin of the arteria profunda, one in the middle of the thigh, and two between the popliteal aneurism and the femoral, making in all seven aneurisms.*

*The following case is curious, perhaps, on account of the number of aneurisms which existed in the same person; but I have introduced it because, having received a useful lesson from it myself, I think the history of it may be of service to others.

W. Wardle, æt. 47, was admitted into St. Thomas's Hospital, on the 29th of May, 1823, on account of a large swelling, which occupied the left ham, and extended on to the fore part of the thigh, just above the knee, projecting chiefly on the inner side over the vastus internus muscle. The integument was florid, and he had rigors, with other symptoms of suppuration. On attentively examining the swelling, I found an evident sense of fluctuation, and pressing my hand firmly upon it, I could feel a thrill, which was also felt by several gentlemen who were with me at the time. His own history of the disease was very unsatisfactory, and certainly rather indicated the formation of an abscess than of an aneurism. There being considerable doubt about the precise nature of the swelling, on the following morning I requested Mr. Green and Mr. Key to see the patient with me: in examining the part, neither of them could feel the thrill I before mentioned; and, on consultation, we determined that a small puncture should be made; as little harm could result from it, even if it proved to be an aneurism. I therefore carefully introduced a lancet near the boundary of the tumour, on the upper part over the rectus muscle, when a jet of arterial blood at once convinced us of the true nature of the disease. The opening was immediately closed by the pressure of the finger on it, and the patient was conveyed into the operating theatre, that a ligature might be placed on the femoral artery. Whilst feeling in the course of the artery, before commencing the operation, I found a small aneurism near the part in which I had intended to secure the vessel; this led to a more minute examination of the patient, and at that period another aneurism was found, just above the tendon of the triceps, on the same side, making two femoral aneurisms and a popliteal on the left side. On the right side the artery felt dilated in several places, but a little below Poupart's ligament an aneurism existed as large as an egg.

After further consultation, it was decided that I should tie the femoral artery between the two small aneurisms, as we feared that a ligature on the external iliac would not command the hæmorrhage from the aneurismal sac; and it appeared probable, that the superior aneurism, which was small, and situated below the profunda, might become obliterated (if the circulation through it were prevented) by coagula forming in it, as in a healthy artery. I therefore exposed the vessel in the usual manner, and placed a ligature on that portion which was situated between the two aneurisms; this was about one or one and a quarter inch in length, and appeared 'sound.

Four days after the operation, I left town for three weeks, during which time he remained under the care of my colleagues; the extremity became gangrenous, and the aneurismal sac in the ham sloughed, exposing the femur. A consultation was held, at which Sir Astley Cooper attended, about the propriety of amputating; but it was not thought advisable, on account of the diseased state of the arteries. The ligature did not separate from the wound until the sixth week; and the patient lingered until the 28th of July.

DISSECTION.

The popliteal and inferior femoral aneurisms of the left side had been destroyed by sloughing; that above the ligature was not closed. On the right side were found three femoral aneurisms, and a small popliteal, making in all seven; besides some dilatation of the aorta, immediately above the bifurcation.—T.

Query—Had his occupation, which obliged him to mount very high ladders, been the means of producing this very extensive disease?

ANEURISMS LOCAL OR GENERAL.

When they occur opposite to a joint, a partial disease of the artery often gives rise to them; but, when they are seated in other parts of the body, there is usually a disease in the arteries, which produces a general disposition to their formation; the ultimate success of operations will depend very much upon the disposition to the disease being partial or general.

OF THE AGE AT WHICH ANEURISMS GENERALLY OCCUR.

The period of life at which they most frequently occur is between thirty and fifty years; at that age, in the labouring classes, the exertions of the body are considerable, and its strength often becomes diminished: in very old age this complaint is less frequent, as muscular exertion is less. The greatest age at which I have seen aneurism has been eighty years; this was in a man for whom I tied the femoral artery in Guy's Hospital, for popliteal aneurism; and, notwithstanding his advanced age, I never had an operation succeed better. I also operated upon a man of sixty-nine years, and that case also did well. A boy, in this Hospital, had an aneurism of the anterior tibial artery, who, I was informed, was only eleven years of age. The man of eighty was the oldest, and the boy of eleven the youngest, which I have seen with aneurism. Age, with general good health, forms no objection to the operation.

OF THE SEX MOST DISPOSED TO ANEURISM.

The male is much more subject to this disease than the female: women are rarely the subject of aneurisms in the limbs; the reason for which is, that they do not exert themselves so much as the other sex. In forty years' experience, taking the Hospital and private practice, I have seen only eight cases of popliteal aneurism in the female, but an immense number in the male. The aneurisms which I have seen in the female, have been the greater number in the ascending aorta, or the carotid arteries.

OF THE FORMATION OF ANEURISM.

The first circumstance which occurs in an artery which is about to produce an aneurismal swelling is, that it becomes opaque and slightly

inflamed ; a small yellow spot appears in the part where the aneurism is afterwards formed, and there is a slight efflorescence surrounding it ; a process of absorption next thins the coat of the artery, so that its texture becomes like a fine web of cellular tissue : at this time nature sets up a process of defence, which is beautifully exemplified in a preparation in St. Thomas's Museum ; it is an incipient aneurism of the aorta ; the coat of the artery has been absorbed, and opposite to the parts absorbed you observe a layer of adhesive matter, by which a defence is produced, and the progress of the disease for a time resisted ; a covering is formed by the adhesive inflammation, which strengthens the artery, and prevents the immediate escape of blood. As the coat of the artery is absorbed, the part in the vicinity of the artery becomes united to its surface by the adhesive process : thus, if it be an aneurism of the ascending aorta, the pleura is united with it, and forms a portion of the aneurismal bag ; the pleura becomes absorbed, and the lung forms a part of the sac ; the lung and pleura costalis are absorbed in their turn, and the intercostal muscles and cartilages of the ribs form a part of the sac ; these removed by absorption, the pectoral muscle becomes the sac, and when this is absorbed, the skin, which is the only covering for the blood, inflames, dies, and sloughs in the way I have already described, and the person loses his life from hæmorrhage.

Former Opinions.—Aneurisms were formerly supposed to be produced by the dilatation of the coats of an artery, and those which arose from wounds or lacerations were called spurious ; but Scarpa first clearly described that aneurism arose from the absorption of the coats of an artery, and that consequently they are generally spurious.

CAUSES OF ANEURISM.

A diseased State of an Artery.—The general cause of aneurism is a diseased state of the coats of an artery, by which it becomes altered in its appearance and thinner in its texture ; but this, although the most frequent, is not the only cause of the disease, for sometimes the artery becomes dilated in its whole circumference. Two excellent specimens of this dilatation are to be seen in our museum. One, in which the general dilatation exists beyond the curvature of the aorta ; and the other, in which it occupies the whole of the curvature.

Laceration of an Artery.—Aneurisms are also produced by laceration of arteries, without any external wound, of which the two following instances have occurred in my practice : A gentleman, who was shooting, in leaping a ditch, slipped from the top of the bank ; at this moment he felt something snap in his ham ; and when he attempted to walk, he found himself lame from the accident ; he was attended by Mr. Holt, surgeon, at Tottenham, and was afterwards brought to town, when he underwent the operation for popliteal aneurism : in this case the aneurism began to form in a very short time

after the accident, and it was about a month after it that the operation was performed. The other case was as follows : A gentleman, whom I was attending for a bad stricture in his urethra, in attempting to raise himself in bed upon his hands, felt something snap in the back of his right hand ; when I next visited him, he told me the circumstance, and desired me to look at a swelling upon his hand ; placing my finger upon it, I felt a pulsating swelling ; I tried what could be effected by pressure, but this did not succeed, and I found it necessary to open the tumour ; it discharged a large quantity of arterial blood, in part coagulated, which proceeded from the radial artery, under the extensor tendons of the thumb ; I tied that artery at the place at which the pulse is usually felt, and I tied it beyond the extensor tendons, between the thumb and fore-finger. A punctured wound made into an artery, or a small incision, will occasion an extravasation of blood into the cellular tissue, which will render the operation for aneurism necessary for its cure.

OF THE DISSECTION OF ANEURISM.

When an aneurismal sac is opened and turned back, the cavity in which the blood is contained is not immediately exposed, but numerous layers of fibrous matter line the inner part of the sac, and form laminæ within each other ; within which the fluid blood is contained ; these laminæ are largest towards the sac, and form a portion of a lesser circle as they approach the fluid blood ; these being removed, and the fluid, or the recently coagulated blood, being spunged away, the orifice of the artery into the sac is directly seen ; sometimes this orifice is small, and is formed by a portion of the circumference of the artery ; and is sometimes large, the whole circumference of the artery having given way.

DIAGNOSIS OF ANEURISM.

Aneurism may be distinguished from other diseases by the following marks ; if the aneurism be small, press the artery which leads to it, and you will empty the aneurismal bag ; but if the aneurism has existed long, is very solid, and its pulsation not very strong, sit by the patient's side, observe carefully the size of the swelling ; press your finger on the artery above, and the aneurism will sink under the pressure on the artery ; upon giving up that pressure suddenly, a jet of blood rushes into the aneurismal bag, and raises it to its former height.

In a doubtful case of aneurism of the groin, Mr. Brodie informed me every doubt vanished upon applying the stethoscope.

If a tumour, not aneurismal, has an artery of large size passing over it, a pulsation is produced which is liable to deceive. I was asked to see a glandular tumour in the neck, over which the carotid artery took its course, and which was easily distinguished from aneurism by the

line of pulsation produced by the artery, whilst the lateral parts of the tumour had no pulsation. When a tumour is situated upon an artery, and derives pulsation from it, it may be distinguished from aneurism by elevating the swelling from the artery which deprives the tumour of its pulsation.

Pulsating tumours in the neck are common, and may be distinguished from aneurism, by desiring the patient to make an effort to swallow. Carotid aneurisms generally do not move with the larynx or trachea : other pulsating tumours in the neck are, for the most part, connected with the thyroid gland, and obey the motions of the air tube in swallowing.

ON THE SPONTANEOUS CURE OF ANEURISM.

Patients should know that this disease, which is generally hopeless without operation, sometimes undergoes a spontaneous cure, for it is a great consolation for them to know this. I have known many examples of this change in aneurism, and will relate one of the most striking: George Bowie was admitted into Guy's Hospital, with an aneurism in the groin ; when the aneurism had acquired considerable magnitude, as he was sitting by the fire in his ward, he suddenly felt a snap in the swelling ; his leg and thigh became immediately swollen and useless, and the patients assisted him into bed. The pulsation in the swelling continued for four days, and then ceased ; the swelling of the limb gradually subsided, and four months afterwards he was able to walk, with scarcely any lameness : I met him one day in the Square of the Hospital, and asking him how he was, he said, " Sir, I am pretty well of my old complaint, but I have got something alive in my inside ;" and upon applying my hand to his abdomen, I found a pulsating tumour : he died from the bursting of this aneurism into the abdomen. I examined him, and we have the parts preserved in the Museum of St. Thomas's Hospital. The aneurism of the thigh had burst under the fascia lata, and the accumulated blood pressed the aneurism on the femoral artery, so as to interrupt the circulation. Both the iliac and upper part of the femoral artery were obliterated, and the blood found its course by the internal iliac vessels.

I have seen spontaneous cures of aneurism produced without any circumstance which would readily explain the cause : one case with Sir William Blizard, at Walworth ; a case of popliteal aneurism ; and another of popliteal aneurism in Guy's Hospital. Mr. Ford has published cases of this description ; and Dr. Baillie has met with similar instances. I once saw, in Guy's Hospital, a man who had an aneurism in the thigh, which had existed several years ; which still retained its pulsation, but had ceased to increase, although it had not diminished : this man died of some other disease ; and upon examination, I found it to be aneurism produced by the general dilatation of the coats of the artery.

ON THE TREATMENT OF ANEURISM.

Little done by Medical Treatment.—From the medical treatment of this disease, I must confess that I have seen but little advantage. Mr. Brown, a surgeon, who had an aneurism of the aorta, was exceedingly strict in his diet, and in his exercise ; but he lived only a very few months. A gentleman, who had an aneurism of his aorta, took four ounces of food three times a day, and refrained almost entirely from exercise ; and although he began this plan in August, almost as soon as the disease was distinctly discovered, yet he died in the following February. The result of my observation is, that two measures only are useful ; the one, abstraction of blood from the arm, when the pulse is hard and full, from which I have seen undoubted benefit arise : the other, the administration of the carbonate of soda, in considerable doses, which, with entire rest, seem to prevent the increase of the swelling ; but the soda is at last obliged to be abandoned, on account of its producing petechiæ : the irritability of the body is often so increased by an antiphlogistic treatment, that the quickness of the pulse which follows does as much injury as the natural force of circulation.

LECTURE XV.

ON THE OPERATION FOR ANEURISM.

As aneurism leads to a gangrenous state of the limb, as well as to the bursting of the aneurismal bag, and subsequently hæmorrhage ; it therefore becomes necessary, in order to preserve the life of the patient, that an operation should be performed, to check the progress of the disease. The operation for it is one of the greatest triumphs of our science ; it is founded upon a knowledge of anatomy, upon the best physiological principles, and upon a thorough acquaintance with the nature of the disease. To that stupendous genius, Mr. Hunter, is mankind indebted for it ; before his time an operation had been performed so rarely successful, that surgeons doubted whether it were best to perform it, or to amputate ; and I can recollect seeing a man, who regularly came to St. Thomas's Hospital to show himself, because he was thought to be a curiosity in having recovered from the operation for popliteal aneurism ; this was forty years ago ; the operation then consisted in applying a tourniquet upon the limb, in making an extensive incision into the aneurismal bag in the direction of the artery : in removing the layers of fibrin accumulated in the sac with

the hand, and in spunging the bag clean. The tourniquet being then loosened, the openings from the artery were seen ; a probe was passed into the orifice towards the heart, and a ligature was tied round that part of the artery ; a probe was carried into the orifice towards the foot, and a ligature was made to surround that portion of the artery : thus a ligature was applied above and below the opening in the sac, and the wound was attempted to be healed as any other in which ligatures are introduced : high constitutional irritation followed this operation, extensive suppuration succeeded, hæmorrhages were frequent consequences, and its issue was generally unsuccessful.

The plan of Mr. Hunter had extensive scientific, and pathological views ; the principle of his operation was, to direct the blood into new channels ; and, instead of disturbing the diseased parts, to leave them to be absorbed by the processes of nature. The whole of his operation, then, in principle, consisted in tying the artery which led to the aneurism, in preventing it any longer from receiving blood from the heart, and in directing the blood into new and anastomosing channels.

OF THE OPERATION FOR POPLITEAL ANEURISM.

It is proper that this operation should be performed before the foot and leg be much swollen. If the patient be of full habit, I find there is no objection to taking away blood from the arm, two or three days prior to the operation, and the patient for a week before should avoid any stimulating food.

Instruments required.—The instruments required are, a common scalpel, a silver knife, a curved-eyed probe of half the usual length of probes, threaded with Dutch twine.

Place of Incision.—The place of the incision is one-third of the length of the thigh from the anterior superior spinous process of the ilium, to the internal condyle of the os femoris. Mr. Hunter performed it just above the tendon of the triceps femoris ; but the artery is more deeply seated there, and has more vessels opening from it which are in danger of injury.

Position of the Patient.—The patient is placed upon a table of convenient height, in the recumbent posture, with his shoulders a little elevated, and his leg slightly bent to relax the sartorius muscle.

Length of the First Incision.—The incision is to be four inches long ; its direction that of the sartorius muscle, and just upon its inner edge. Any large branch of the saphena vein is to be avoided, and the first incision is to expose the fibres of the sartorius.

The second incision is to separate the inner edge of the sartorius from the adductor longus femoris, and this merely divides the cellular tissue. The sartorius is then gently drawn outwards, and the sheath of vessels becomes exposed, in which the artery, being more superficial than the vein, may be felt pulsating. A third incision opens the

sheath, and this must be done with caution, as the sheath is to be divided over the artery. A septum is found between the artery and vein. The point of the silver knife may be here most safely used, to farther open the sheath, and to admit the probe. The probe is to be introduced under the artery with great care, to avoid injury to the vein, and to exclude any branch of nerve, as I have known the saphenus nerve included in the ligature, and numbness produced in the course of the saphena vein. The probe being brought out at the wound, the ligature is then left under the artery. All this is to be effected with as little disturbance to the artery as possible. The ligature is to be then tied, first passed through twice, and then only once in making the knot secure. If any small vessel bleeds in the operation above the site of the ligature upon the artery, let it be immediately secured by a thread; as, from the interruption to the circulation in the principal vessel, the smallest artery is apt to bleed freely. Directly as the ligature is made secure, the pulsation in the tumour generally ceases; I say generally, because I have known an obscure pulsation remain through the influence of anastomosing vessels.

Dressing the Wound.—When the ligature has been securely tied, cut off one of its ends, and leave the other hanging from the centre of the wound. Bring the edges of the skin exactly together, and secure them by adhesive plaster, leaving small interstices to permit the escape of discharge. Do not apply any bandage, and let the patient be carried to bed in the recumbent posture. Place the limb in a slightly bent position, rather on its outer side, and the foot is to be wrapped in flannel.

Other Modes of operating.—These are the steps of the operation; attempts have been made by ingenious surgeons to improve upon this mode of performing it, and one of the best proposals for this purpose was made by Mr. Cline. As hæmorrhage sometimes occurs at the time the ligature separates, he proposed to prevent ulceration of the artery by using a broad ligature, tying it upon a piece of cork, and removing it after some days, before ulceration usually begins. The first operation succeeded; but he afterwards found the introduction of an extraneous body produced too much irritation.

Mr. Crampton's.—Mr. Crampton, of Dublin, used an ingenious instrument, which he called the presse artère, with the same view.

Dr. Jones's.—Dr. Jones (author of an excellent work on the natural means of suppressing hæmorrhage) having found that small ligatures cut the inner coat of an artery without injury to the external, advised that the ligature should be tightly tied, and then removed, the artery being left to adhere when it was exposed. I tried this plan in two instances.

Experiments.—The first was in a case of popliteal aneurism in Guy's Hospital. I put a ligature around the femoral artery at the usual place; and tying it very tight, after thirty hours I loosened it. The pulsation in the aneurism returned after half a minute with the same force as prior to the operation; I, therefore, again tightened the

ligature, and suffered it to remain forty-two hours longer ; after seventy-two hours I removed the ligature, and the pulsation did not return ; thirteen days after, as I entered the square of the Hospital, one of my dressers informed me, the man had hæmorrhage from the femoral artery. I visited him immediately, and found it to be so ; a tourniquet was applied just above the wound, the hæmorrhage did not return, and the patient recovered.

The second case was an aneurism of the radial artery, produced by a wound ; I removed the ligature twenty-four hours after it had been applied, but the pulsation returned ; I made an incision into the tumour, applied a ligature upon the artery above and below the openings into the sac, and the aneurism was cured.

Mr. Abernethy's.—Mr. Abernethy proposed a new and very ingenious mode of operating for this disease, by placing two ligatures upon the artery, and dividing the vessel between them ; thus reducing the extremity of the vessel nearest to the heart, to the state in which it is in a stump. I have often performed this operation, and very successfully ; and I think it ought to be adopted in all cases in which the artery is much disturbed in the operation, and separated from the surrounding cellular tissue ; as the division of the artery enables it to retract into the cellular membrane above ; it is liable, however, to one objection, viz., to the ligature escaping from the artery soon after its application ; this happened to Mr. Cline, sen. in St. Thomas's Hospital, and to myself in Guy's Hospital ; both ligatures came off the artery as I divided it, but I immediately replaced them.

Of Cutting off both Ends of the Ligature.—It has been recommended to cut off both ends of the ligature close to the knot, in the hope that the wound would heal over it, and that it would remain without producing inflammation ; but experience has shown that it separates by ulceration, and often produces a considerable degree of irritation.

OF THE AFTER-TREATMENT OF THE PATIENT.

Application of Flannel.—A piece of flannel is to be placed around the limb, or a warm stocking to be worn, to preserve the warmth of the limb, for there is danger of gangrene in cold weather ; the heat of the foot is generally two degrees more than that of the sound side ; but if it be exposed to the influence of low temperature, it is easily robbed of the heat which is necessary to its preservation. Before I learned this, I had operated upon a young gentleman during the winter, who, when I visited him in the evening, complained of great coldness, numbness, and a sense of weight in his foot ; this induced me to look at the limb, and I found that the foot was quite cold, and that the blood was stagnant in it. I sat down by the bedside of the patient, and rubbed his leg with a warm flannel till heat was restored to the limb ; and ever since that time I have wrapped the limb in a piece of flannel, and sometimes put bottles filled with hot water to the feet, if the weather be particularly cold.

For a few days after the operation, a considerable degree of constitutional irritation is produced ; and I have in two or three instances known retention of urine occur, rendering the introduction of the catheter necessary. The medicine best suited to the patient is a simple saline draught with sulphate of magnesia ; and opium may be administered, if there be any considerable degree of irritability. Great care must be taken that the patient does not rest too much upon his heel, as a gangrenous spot is apt to form there, if that be permitted ; the patient must make no effort to use the limb, as any disturbance of the sartorius muscle prevents the ready adhesion of the wound. Every other day will be sufficient for the reapplication of the dressings ; and for the first four days, at least, they should not be disturbed.

Separation of the Ligature.—Between the eleventh and fifteenth day the ligature usually separates, but I have known a broad ligature twenty-seven days in ulcerating. Nothing must be done to assist the separation of the ligature, leave it entirely to a natural process. For three or four days after the ligature has separated, carefully guard the patient from raising himself in bed, for the following reason.

Case.—A sailor endeavouring to push his pocket knife through a cable, which was placed between his thighs, the knife slipped, and entered his femoral artery ; a profuse hæmorrhage ensued ; a tourniquet, made by a handkerchief and stick at the moment, was put around the limb, and he was brought to Guy's Hospital. I put a ligature above and below the wound in the artery, and on the fourteenth day these ligatures separated : at twelve o'clock the same day he was sitting in his bed washing his hands, when a gush of blood took place from the wound. A tourniquet was directly applied by the dresser, and I was sent for. The hæmorrhage proceeded from the portion of the artery nearest the heart, upon which I placed a ligature, which rendered it necessary for the man to keep his bed for three weeks longer ; but he ultimately recovered : this shows the necessity of perfect stillness on the part of the patient, whilst the ligature is separating and the adhesion is remaining feeble.

Mode in which Circulation is carried on.—After this operation the circulation is carried on principally by the arteria profunda ; its branches communicate with the articular arteries of the popliteal, and with arteries sent to the knee by the anterior and posterior tibial ; large branches in the sciatic nerve, sent off by the arteria profunda, communicate very freely with the popliteal artery, the articular of the knee joint, and with branches of the posterior tibial artery ; the freedom of anastomosis now and then leads to a reproduction of an aneurism, of which you have all had an opportunity of seeing an instance during the present season in Guy's Hospital. The femoral artery had been tied last year by Mr. Key, and the man was discharged cured ; but during the present season he has returned with a very painful tumour in the ham, having an obscure pulsation in it, the flexor muscles of the knee were extremely rigid, and the man's health was giving way so rapidly, that I was obliged to amputate the limb, and a large artery which passed

to the tumour was obliged to be secured nearly in the situation usually occupied by the femoral artery.

Subsequent Gangrene.—I have known the operation fail in three or four instances from gangrene of the leg which demanded amputation.

Hæmorrhage.—I have also seen it several times fail from hæmorrhage, but more frequently formerly than of late years; now the principles of the operation are so well understood.

This, however, occurs in some instances, on account of the artery not being closed at the time the ligature separated, in consequence of which the patient has been destroyed by hæmorrhage; this arose from a deficiency of power in the constitution, so that the necessary degree of inflammation had not been produced, or from a diseased state of the artery itself.*

Case.—Mr. Birch lost a patient in St. Thomas's Hospital, from the femoral artery being tied too near to the arteria profunda to allow of adhesion of the inner coats of the artery, and consequently to prevent hæmorrhage.

* A case of this nature occurred to Mr. Bransby Cooper, of which the following are the particulars:

On the 9th of June, 1823, Mr. Gaitskell, of Rotherhithe, was requested to see J. C. Esq. æt. 49, on the account of a sudden appearance of a swelling on the upper part of the left thigh, three inches below Poupart's ligament; which proved to be a femoral aneurism. Sir Astley Cooper was consulted, and as but little pulsation existed in the tumour, he thought a spontaneous cure might take place, and recommended that the patient should adopt those measures most likely to assist the efforts of nature. On the 21st of June, however, Mr. C., whilst in the act of raising himself in bed, felt something give way in the thigh; this was immediately followed by a rapid increase of the swelling, which soon extended to Poupart's ligament. Sir A. Cooper was sent for, but being out of town, his nephew (Mr. Bransby Cooper) attended for him, and after a consultation with Mr. J. H. Green, a ligature was placed on the external iliac. The operation was performed with great facility in the usual manner.

Every thing went on favourably for eighteen days after, when a slight arterial hæmorrhage took place from the wound, which returned at intervals on the 19th, 20th, and 21st days; when it entirely ceased for forty-eight hours. The wound appeared healed, excepting near the ligature, around which a glassy granulation protruded. On the 24th, 25th, and 26th days, the bleedings returned oftener and more violently than before, but were checked for a time by pressure and cold applications; the patient became much exhausted from the repeated loss of blood, and the wound again opened. On the 27th, a profuse hæmorrhage supervened, which separated the ligature, and an hour after the patient expired.

DISSECTION.

The artery was completely divided, and the extremities were above an inch apart. The superior portion was slightly glued to the psoas muscle by adhesive matter; it contained a small loose coagulum, but there was not the slightest appearance of any adhesive process internally. The inferior portion was also open, but did not contain any coagulum. The coats of the artery were extremely thin and semitransparent, having much more the character of the coats of a vein than an artery.—T.

OF ANEURISM OF THE ANTERIOR TIBIAL ARTERY.

If this disease be placed at the upper part of the leg, the same operation is required for it as that which is performed for popliteal aneurism. Mr. Lucas, sen. surgeon at Guy's Hospital, had a patient with anterior tibial aneurism seated a little below the head of the fibula. He performed the operation of tying the femoral artery, and the pulsation in the aneurism ceased, and the swelling for a time subsided. The case did not ultimately recover, for a slough took place of the aneurismal sac; but the failure arose not from the operation being inappropriate, but from a very unhealthy constitution. Mr. Henry Cline had a case of this disease upon the upper part of the foot, and he tied the anterior tibial artery at the lower part of the leg, but the pulsation in the aneurism continued when the boy quitted the Hospital. It will be, therefore, right to tie the artery by opening the sac, so as to secure it above and below the aperture, if the aneurism be seated low down in the limb, as the anastomosis with the plantar arteries is exceedingly free.

OF ANEURISM OF THE POSTERIOR TIBIAL ARTERY.

I have tied the femoral artery for an aneurism, under the calf of the leg, in the posterior tibial artery, in a man of the name of Fox, aged sixty-nine years, who proceeded quite favourably.

OF INGUINAL ANEURISM.

The femoral artery sometimes forms an aneurism just opposite the hip-joint and below Poupart's ligament. I have also seen it at the origin of the arteria profunda; but if the aneurism be placed any where between the groin and the middle of the thigh, it is best to tie

THE EXTERNAL ILIAC ARTERY.

Mode of operating.—The operation is performed as follows:—The patient being placed in the recumbent posture on a table of convenient height, the incision is begun just above the abdominal ring, and is extended downwards in a semi-lunar direction to the upper edge of Poupart's ligament, and again upwards, to within an inch of the anterior and superior spinous process of the ilium. This incision exposes the tendon of the external oblique muscle: in the same direction the above tendon is to be cut through, and the lower edges of the internal oblique and transversalis abdominis muscles are exposed; the centre of these muscles is then to be separated from Poupart's ligament; the opening

by which the spermatic cord quits the abdomen, is thus exposed, and the finger passed through this space is directly applied upon the iliac artery above the origin of the epigastric and circumflex ilii arteries. The iliac artery is placed upon the outer side of the vein; and the next step of the operation consists in gently separating the vein from the artery by the extremity of a director, or by the end of the finger. The iron curved aneurismal needle is then passed under the artery, and between it and the vein from without inwards, carrying a ligature, which being brought out at the wound, the needle is withdrawn, and the ligature is then tied around the artery, as in the operation for popliteal aneurism. One end of the ligature being cut away, the other is suspended from the wound, the edges of which are brought together by adhesive plaster, and the wound is treated as any other containing a ligature.

Amid the many cases of this operation which I have had occasion to perform, two of them have been in medical men, Mr. J. of Stamford, and Mr. C. of Worcester, both of whom are now living. One unfortunate case only occurred, in which I lost the patient from hæmorrhage, which took place on the fifteenth day after the operation. I applied another ligature, but the man sunk from the debility consequent on the loss of blood.

THE INTERNAL ILIAC ARTERY

Has been tied by Mr. W. Stevens, surgeon, in the island of Santa Cruz, for the cure of a large aneurism of the left gluteal artery. The following account of the operation has been published in the fifth volume of the *Medico-Chirurgical Transactions*:

Operation.—An incision, about five inches in length, was made on the left side, in the lower and lateral part of the abdomen, parallel with the epigastric artery, and nearly half an inch on the outer side of it. The skin, the superficial fascia, and the three thin abdominal muscles, were successively divided; the peritoneum was separated from its loose connexion with the iliacus internus and psoas muscles; it was then turned almost directly inwards, in a direction from the anterior superior spinous process of the ilium, to the division of the common iliac artery. In the cavity which I had now made I felt for the internal iliac, insinuated the point of my fore-finger behind it, and then pressed the artery betwixt my finger and thumb. Dr. Laing now felt the aneurism behind; the pulsation had entirely ceased, and the tumour was disappearing. I examined the vessel in the pelvis; it was healthy and free from its neighbouring connexions; I then passed a ligature behind the artery, and tied it about half an inch from its origin. The tumour disappeared almost immediately after the operation, and the wound healed kindly. About the end of the third week the ligature came away, and in six weeks the woman was perfectly well.

The case in which I put a ligature on the aorta, has been published in the first part of the Surgical Essays. I shall, therefore, only give a short extract from it here.

LIGATURE ON THE AORTA.

Case.—Charles Hutson, a porter, æt. 38, was admitted into Guy's Hospital, on the 9th of April, 1817, for an aneurism in the left groin, situated partly above and partly below Poupart's ligament. The swelling was very much diffused, and pressure upon it gave considerable pain. On the third day after he had been in the Hospital, the swelling increased to double its former size, and extended from three to four inches above Poupart's ligament to an equal distance below it, and was of great magnitude. Just below the anterior and superior spinous process of the ilium, a distinct fluctuation could be felt in the aneurismal sac, so that the blood had not evidently yet coagulated; and the peritoneum was carried far from the lower part of the abdomen, in such a manner as to reach the common iliac artery, and to render an operation impracticable without opening the cavity of the peritoneum. I therefore was extremely averse to perform an operation, and determined to wait and see if any efforts would be made towards a spontaneous cure.

He was occasionally bled, kept perfectly quiet, and pressure was applied on the tumour. June 19th, a slough was observed on the exterior part of the swelling below Poupart's ligament, which, in part, separated on the 20th, and he had some bleeding from the sac, but it was easily stopped by a compress of lint, confined on the part by adhesive plaster. On the 22d, after some slight exertion, he bled again, but not profusely. 24th, the bleeding again recurred, but stopped spontaneously. 25th, about half past two o'clock, in consequence of a sudden mental agitation, bled profusely, and became so much exhausted, that his fæces passed off involuntarily; but Mr. Key, then my apprentice, succeeded in preventing immediate dissolution by pressure. At nine o'clock the same evening I saw him, and found him in so reduced a state, that he could not survive another hæmorrhage, with which he was every moment threatened. Yet still anxious to avoid opening the abdomen, to secure the aorta near to its bifurcation, I made an incision into the aneurismal sac, above Poupart's ligament, to ascertain if it were practicable to pass a ligature around the artery from thence. On introducing my finger, I found that the artery entered the sac above and quitted it below, without there being any intervening portion of vessel; I, therefore, was obliged to abandon that mode of operating; and as the only chance which remained of preventing his immediate dissolution, by hæmorrhage, was by tying the aorta, I determined on doing it. The operation was performed as follows:

Operation.—The patient's shoulders were slightly elevated by

pillows, in order to relax, as much as possible, the abdominal muscles ; for I expected that a protrusion of intestines would produce embarrassment in the operation, and was gratified to find that this was prevented by their empty state, in consequence of the involuntary evacuation of the fæces. I then made an incision, three inches long, into the linea alba, giving it slight curve, to avoid the umbilicus : one inch and a half was above, and the remainder below the navel. Having divided the linea alba, I made a small aperture into the peritoneum, and introduced my finger into the abdomen ; and then with a probe-pointed bistoury enlarged the opening into the peritoneum, to nearly the same extent as that of the external wound. During the progress of the operation, only one small convolution of intestine projected beyond the wound.

Having made a sufficient opening to admit my finger into the abdomen, I passed it between the intestines to the spine, and felt the aorta greatly enlarged, and beating with excessive force. By means of my finger nail, I scratched through the peritoneum on the left side of the aorta, and then gradually passed my finger between the aorta and spine, and again penetrated the peritoneum, on the right side of the aorta.

I had now my finger under the artery, and by its side I conveyed the blunt aneurismal needle, armed with a single ligature behind it ; and Mr. Key drew the ligature from the eye of the needle to the external wound, when the needle was withdrawn.

The next circumstance, which required considerable care, was the exclusion of the intestine from the ligature, the ends of which were brought together at the wound, and the finger was carried down between them, so as to remove every portion of the intestine from between the threads : the ligature was then tied, and its ends were left hanging out of the wound.

During the operation the fæces passed involuntarily, and the patient's pulse, both immediately and for an hour after the operation, was 144 in a minute. I applied my hand to his right thigh, immediately after the operation, and he said that I touched his foot, so that the sensibility of the leg was very imperfect.

The omentum was drawn behind the opening as far as the ligature would admit, so as to facilitate adhesion ; and the edges of the wound were brought together by means of a quilled suture and adhesive plaster.

He remained very comfortable until the following evening, when he vomited, and his fæces passed off involuntarily. 27th. Seven o'clock A.M. had passed a restless night, and had vomited at intervals ; pulse 104, weak and small ; pain in his head ; great anxiety of countenance ; very restless, and his urine dribbled from him. He gradually sunk, and died at eighteen minutes after one o'clock, having survived the operation forty hours.

DISSECTION.

No peritoneal inflammation, but at the edges of the wound, which were glued together by adhesive matter, excepting at the part at which the ligature protruded. The thread had been passed around the aorta, about three quarters of an inch above its bifurcation, and rather more than inch below the part at which the duodenum crosses the artery; it had not included any portion of omentum, or intestine. Upon carefully cutting open the aorta, a clot, of more than an inch in length, was found to have sealed the vessel above the ligature; below the bifurcation, another, an inch in extent, occupied the right iliac artery; and the left was closed by a third, which reached as far as the aneurism: all were gratified to observe the artery so completely shut in forty hours. The aneurismal sac, which was of a most enormous size, reached from the common iliac artery to below Poupart's ligament, and extended to the outer part of the thigh. The artery was deficient from the upper to the lower part of the sac, which was filled with an immense quantity of coagulum.*

ANEURISM OF THE CAROTID.

I have twice performed the operation of tying the common carotid, on account of the existence of aneurism; and as both these cases have been already published in the first volume of the *Medico-Chirurgical Transactions*, it will be only necessary to give a short account of them here, and of the mode in which this operation is to be performed.

Case.—The first case is that of Mary Edwards, æt. 44. The swelling occupied two-thirds of the right side of the neck, pulsated very strongly, and the integument at the most prominent part of the tumour appeared very thin. It had existed six months previous to the operation, which was performed as follows:—On November 1, 1805, I made an incision, two inches long, on the inner edge of the sterno-mastoid muscle, from the inferior part of the tumour to the clavicle, which laid bare the omo and sterno-hyoideus muscles, which being drawn aside towards the trachea, exposed the jugular vein. The motion of this vein produced the only difficulty in the operation; as, under the different states of breathing, it sometimes presented itself to the knife tense and distended, and then as suddenly collapsed. Passing my finger into the wound, to confine that vein, I made an incision upon the carotid artery, and having laid it bare, I separated it from the par vagum, and introduced a curved aneurismal needle under it, taking care to exclude the recurrent nerve on the one hand, and the par vagum on the other. The

* In an operation which I lately performed of tying the external iliac artery much above Poupart's ligament, I think I could with little difficulty have reached the aorta, by turning up the peritoneum without dividing it; and should I again wish to put a ligature on the aorta, I should prefer this method to the one I have before adopted.

two threads were then tied about half an inch asunder, being the greatest distance to which they could be separated : on account of the short space, I did not divide the artery. As soon as the threads were tied, all pulsation in the tumour ceased, and the wound was superficially dressed.

Immediately after the operation she was seized with a severe fit of coughing, which continued half an hour, when she became more tranquil, and slept six hours the following night. She continued in a favourable state until the 8th, when it was observed that her left arm and leg were paralytic : she was restless, but had not any pain in the head. 9th : Could not swallow solids, and felt occasional pricking pain in the wound. 11th. Power of motion of the left arm returned, and she appeared going on favourably. 12th. The two ligatures came away with the intervening portion of artery. She went on well until the 17th, the tumour reducing, and the wound healing ; when the wound again opened, the tumour increased, and was painful ; she had a violent cough, great difficulty in swallowing, and a high degree of constitutional irritation. From this time she gradually got worse, and died on the 21st.

DISSECTION.

Inflammation of the aneurismal sac, which contained coagula and pus ; the inflammation extended nearly to the basis of the skull, in the course of the par vagum. The glottis was almost closed, and the internal surface of the trachea was inflamed, fibrin adhering to its mucous membrane. Owing to the pressure of the tumour, the pharynx would scarcely admit a bougie of the size of a goose-quill. The cause of her death then was the inflammation of the aneurismal sac and of the adjacent parts, by which the size of the tumour became so increased as to press on the pharynx and prevent deglutition, and upon the larynx, so as to excite coughing, and to impede respiration.

Case. — Humphrey Humphreys, æt. 50, an iron-porter, had an aneurismal tumour on the left side of the neck, about the size of a walnut, extending from the angle of the jaw to the thyroid cartilage. He had observed it about six months previous to the operation, and it was accompanied with violent pain in the head, and a sense of pulsation in the brain. When the sac was emptied by pressure on the artery below, the tumour regained its original size by one contraction of the heart.

The operation was performed at Guy's Hospital, on the 22d of June, 1808, in the same manner as in the preceding case, only that the artery was divided between the ligatures. The pulsation in the tumour did not, however, entirely cease ; but the pain in the head subsided immediately, and did not again return.

The patient had scarcely an unpleasant symptom following the operation ; the wound healed, as far as the ligatures would permit, by adhesion ; the ligatures came away on the 14th and 15th of July ; the tumour gradually diminished, but an obscure pulsation existed in it until the beginning of September, when it could not be felt. The wound closed slowly, and the man returned to his employment on the 14th of September.

SUBCLAVIAN ANEURISM.

The operation for tying the subclavian artery was first successfully performed by Dr. Post, of New York, and since by Mr. Lister, Mr. Todd, Mr. Gibbs, Baron Dupuytren, Mr. Key, and others. The following were the steps of the operation in Mr. Key's case :

The patient being laid upon an inclined plane, formed by the lithotomy table, so that the light from a large sky-light could be thrown into the triangular space in which the artery lies imbedded ; I drew the integuments down over the clavicle, and cut freely upon the bone, beginning the incision about half an inch over the clavicular portion of the sterno-mastoid, and continuing it outwards for about three inches. The integuments being relaxed, the incision became raised about a third of an inch above the clavicle, and exposed the platysma myoides, which was divided to the same extent. Several turgid veins were now exposed upon the cervical fascia, to avoid which was impossible ; they were therefore divided, and about three ounces of blood lost ; one, larger than the rest, Mr. Travers secured, to prevent any obstruction in the after-steps of the operation. The outer layer of the cervical fascia was then divided by the knife, and the loose cellular texture, enveloping the glands of the neck, being detached by the finger, the omohyoideus muscle was laid bare ; a little farther dissection then discovered the artery to the finger ; but the depth of the angle, in which it was enclosed, rendering it impossible to pass a ligature under it in so confined a space ; about half an inch of the sterno-mastoid was divided, which gave considerable room. The artery was then exposed by means of a director, and the aneurismal needle was readily conveyed under it, by passing it from below upwards. The method I adopted to prevent any difficulty in passing the ligature under the vessel, is detailed in the *Medico-Chirurgical Transactions*. It is now a twelve-month since the operation was performed ; the pulse in the radial artery is scarcely perceptible, although the man enjoys very good use of the limb, and is otherwise in perfect health.

ANEURISM OF THE BRACHIAL ARTERY.

I do not remember to have seen a case of aneurism from disease in the brachial artery ; but I have seen several at the elbow joint, arising

from a wound of this artery ; and as the treatment is the same in each, I will describe the operation which is required :—An incision is made in the middle of the arm between the shoulder and elbow, on the inner edge of the biceps flexor cubiti, of three inches in length, which directly exposes the brachial artery, its vena comites, and the median nerve : the artery is to be a little dissected from the nerve and veins, and then a probe is to be carried under the artery, armed with a ligature ; the probe is to be withdrawn, leaving the ligature under the vessel ; the ligature is then to be secured, as in the former operations, with as little disturbance to the artery as possible ; one end of the thread is to be removed, whilst the other is suffered to remain between the edges of the wound, which are to be nicely adjusted with adhesive plaster. It is better not to make an incision upon the artery at the elbow joint, as most important parts are divided, and constitutional irritation runs so high as to occasion the destruction of life, as the following case explains :

Case.—One of our young gentlemen at Guy's Hospital, in bleeding a patient, recently admitted for an accident, had the misfortune to prick the artery ; the jet of blood, its arterial colour, and the quantity lost in a short time (being thirty-seven ounces), immediately informed him of the nature of the injury. He bound up the arm as tightly as the patient could bear, and succeeded in suppressing the hæmorrhage ; but, on the fourth day, the tightness of the bandage produced so much pain, that the patient could bear it no longer, and he requested that it might be somewhat loosened ; but so soon as this was done, the bleeding was renewed, and one of the surgeons of the Hospital was sent for ; he made an incision upon the artery at the elbow joint, where it had been injured ; the operation was exceedingly tedious and difficult, but at last the artery was secured above and below the opening ; violent constitutional irritation succeeded, and, on the eighth day from his being bled, the man expired. The preparation taken from this man's arm is preserved in St. Thomas's Hospital.

Old Operation sometimes proper.—When this aneurism acquires very great magnitude, it is proper to perform the old operation. I lately saw Mr. Morgan, surgeon of Guy's Hospital, perform this operation easily and adroitly, in a case of large aneurism.

ANEURISM OF THE ULNA ARTERY.

I have seen only one case of aneurism of the ulna artery from disease ; it was in a patient of Mr. Chandler's, in St. Thomas's Hospital ; the aneurism was seated where the artery dips under the pronator radii, teres, and flexor muscles of the hand. Mr. Chandler tied the artery above the swelling ; it was an extremely difficult and tedious operation, and it would have been much better to have tied the brachial artery, either in the middle of the arm, or to have opened the aneurismal sac, and to have tied the artery above and below its opening. The patient died from the constitutional irritation resulting from this operation.

In aneurism of the ulna artery, situated at the wrist, it is right to open the sac, to tie the artery above and below the opening, taking care to exclude the ulna nerve, which closely accompanies the artery.

In aneurisms of the radial artery at the wrist, which are frequently occurring by wounds from glass, the aneurismal sac must be opened, and the artery tied above and below the opening. Mr. W. Cooper, formerly surgeon at Guy's Hospital, in performing this operation, found the upper portion of the radial artery obliterated, and that the aneurism was supported by regurgitation from the hand, from the free anastomosis with the ulna artery.

OF ANEURISM OF THE SCALP.

Those which I have witnessed are as follows :—an aneurism of the posterior aural artery, in a patient of Mr. Fry, surgeon, at Dursley, Gloucestershire, which had been produced by a blow from her husband. I opened the sac, and was compelled to tie not only the vessel which led into the sac, but numerous others, entering in all parts of the circumference of the swelling.

I have seen several cases of temporal aneurisms from arteriotomy in that vessel. One in Mr. Hensleigh, a medical student. I opened the sac, secured the temporal artery at its lower part, and was then obliged to secure many others entering the circumference of the sac, which had been excessively dilated. One case I saw from Mr. Toulmin, of Hackney, produced by striking the temple against the corner of a dining table.

A young lady, whom Mr. Cline and myself have visited in consultation, has a large pulsation tumour in the forehead, above the eye-brow, the cause of which is unknown. In this case, I propose to make a circular incision around the sac to the bone, to divide all the vessels which feed it, and then to make use of pressure upon it.

The operation best calculated to cure aneurisms of the scalp is to cut directly across them, and to make use of pressure to stop the bleeding, to prevent the course of the blood through the swelling, and to produce adhesion of the sides of the sac.

Aneurisms are to be prevented after arteriotomy by the complete division of the vessel.

OF THE ANEURISMAL VARIX.

When the brachial artery is punctured with the lancet through the vein in bleeding, an adhesion is sometimes produced between the one and the other; and the blood, flowing from the artery into the vein, causes an enlargement of the latter, opposite the elbow joint. The swelling is called aneurismal varix, from the enlargement of the vein,

and from its connexion with the artery. The swelling of the vein acquires the size of a pigeon's egg, and then it usually ceases to increase. There is a pulsation in the swelling, with a thrilling sensation, and a hissing noise. If the artery be compressed above, the swelling becomes flaccid, and can be emptied of its blood ; but if the arm be compressed below the swelling, the pulsation continues, and the size of the swelling remains unaltered. The brachial artery, above the varix, becomes enlarged, owing to the greater quantity of blood which it conveys.

The swelling of the vein proceeds to the size which I have mentioned, and then becomes stationary. A woman, with this altered state of the circulation, used frequently to exhibit her arm to the students for many successive years, and it seemed to remain annually the same.

No operation has been required for this disease, in any case which I have seen of it, as it is not a dangerous state, either to the life or even to the arm. It renders the arm weaker, and nothing more serious arises from it.

Case.—Mr. Atkinson, a most respectable surgeon at York, sent me an account of a case, in which an operation had been performed for this disease, and it proved fatal.

Treatment.—When the accident has recently occurred, it may be cured by the following plan.

Case.—A young lady was brought to my house by the surgeon who had the misfortune to prick the brachial artery in bleeding. The wound had healed, but an aneurismal varix followed, of the size of a pigeon's egg, attended with strong pulsation, a thrill, and a hissing noise. I ordered it to be compressed with a dossil of lint and a roller ; but it did not succeed in subduing it. I then directed that a circle of iron should be put round the arm, with a pad, which could be screwed down on the brachial artery, in the middle of the arm, between the shoulder and elbow joint. This she bore without much suffering, and gradually the swelling at the elbow subsided, and pulsation in the brachial artery and in the tumour could be no longer perceived. As the gentleman, who attended the case with me, was well acquainted with Mr. Abernethy, he took the young lady to Mr. Abernethy, at my request, to show him the cure of this disease.

LECTURE XVI.

ON HYDROCELE.

Definition.—HYDROCELE is an accumulation of fluid in the tunica vaginalis testis, producing a pyriform, fluctuating, and generally a transparent swelling in the scrotum.*

Symptoms.—In this disease the symptoms are as follow : a swelling begins about the testis, unattended with pain, and is usually observed only by accident. It is at first flaccid, and the fingers readily sink through it, so that the testis can be distinctly felt. As it increases, the swelling becomes tense, and conceals the testis. It then assumes a pyriform shape, the largest part of the swelling is opposite to the testis, and as it rises towards the abdominal ring, its diameter gradually lessens. It is generally unattended with pain. Some few of the vessels of the scrotum are enlarged, but the skin does not appear to be inflamed, and the patient suffers no inconvenience but from its weight and its magnitude : his general health being unaffected.

Transparency.—Upon accurate examination of the swelling, it is found to be transparent ; and, as some surgeons deny the truth of this, it must arise from their not understanding the mode of making the examination. The room is to be darkened ; the patient holds a candle, burning brightly, close to the side of the scrotum, and the surgeon grasps the posterior part of the swelling, so as to render its fore part as tense as is possible ; then the surgeon, looking at the swelling from the side opposite to the candle, and placing his left hand on the fore part of the scrotum, immediately discovers transparency. I have seen surgeons place a candle on one side, raise the scrotum, and look from the other, and say the swelling is not transparent ; and in this way it scarcely ever will be. The strong light of the sun, falling directly on the part, answers equally well, in showing its transparency.

Fluctuation.—Hydrocele has a distinct fluctuation, which may be observed in the most distant parts of the swelling, by pressing with the fingers at remote parts. However, when it is excessively distended it feels hard.

Situation of the Testicle.—The testis is generally placed two-thirds of the swelling downwards, and at the posterior part of the scrotum ; pressure at that part gives the sensation of squeezing the testis, and when the swelling is transparent the testis may be seen there.

Hydrocele is a very moveable swelling ;—if it does not distend the

* The term Hydrocele applies to any watery tumour ; but it is now limited by surgeons to hydrocele of the tunica vaginalis, and to hydrocele of the spermatic cord.

part much in the course of the spermatic cord, it bends easily upon the abdomen, and moves readily in all directions.

Such is the usual character of the disease ; but sometimes, and not unfrequently, it is the result of inflammation of the testis, when it is preceded by pain, redness, hardness, and swelling of the part, which assumes more the form of the testis itself, and is less distinctly transparent.

Nature of the Fluid.—The fluid which hydrocele contains resembles serum ; like it, yellow and transparent ; like it, coagulable by heat, by acids, and by alcohol : it coagulates in Port wine and in solutions of the sulphate of zinc, used as injections.

VARIETIES OF HYDROCELE.

As this disease is subject to great varieties, it is necessary these should be particularly pointed out.

On both Sides.—The disease sometimes exists on both sides of the scrotum, and when this happens the swelling must be cured in succession.

Testicle on the Fore Part.—The testis varies in its situation in this disease ; it is sometimes glued to the fore part of the tunica vaginalis, and the serum is accumulated on each side of it. I was called to the following case:—A gentleman consulted a surgeon for a swelling in the scrotum, which he pronounced to be hydrocele. He put a trochar into it ; no water followed, and he said “ I am mistaken ; this is a solid enlargement of the testis, and it must be removed.” The patient, excessively alarmed at so severe a sentence, said he should require time to think of it, and another surgeon was consulted. When his clothes were loosened, venereal spots were observed upon the skin of the abdomen, and he had a node upon the tibia. Mercury and sarsaparilla were given him, and he got well of those symptoms. But the swelling remained in the scrotum, and was clearly an hydrocele, from its fluctuations and its transparency ; but with the testis adhering to the anterior part of the tunica vaginalis. It was injected from the side instead of the fore part, and the patient perfectly recovered.

Result of Inflammation.—When hydrocele is the result of inflammation of the testis, the water is accumulated (in consequence of an unnatural adhesion of the tunica vaginalis) above the testis, or below it, and upon either side.

In our collection at St. Thomas's, we have a preparation of the tunica vaginalis giving way posteriorly to the pressure of the water, and forming a new and additional sac.

Two Swellings.—Hydrocele sometimes forms two swellings, one in the scrotum, another at the abdominal ring, with a smaller swelling of communication between them :—this has much the appearance of hernia.

Two distinct hydroceles are sometimes formed upon the same side, of which the following is an example.

Case.—Mr. Roberts, surgeon, of Malmesbury, in Wiltshire, consulted Dr. Cheston, of Gloucester, respecting a patient of his who had hydrocele ;—and it was agreed that the water should be drawn off, which Mr. Roberts did in Dr. Cheston's presence ; but they were both surprised to see a swelling remaining, half as large as at first, and which could not be emptied through the canula. The canula was therefore withdrawn, and soon after he was sent to London, where I saw him. I tapped the hydrocele, and a yellow serous fluid was discharged ; but still half the swelling remained. I then darkened the room, ordered a candle, and examined the swelling, and which extended from the upper part of the testis to the abdominal ring :—it was very transparent. I therefore tapped it, and drew off a fluid like water, quite free from colour. I afterwards injected the lower hydrocele, and repeatedly tapped the upper swelling. This additional swelling was either hydrocele of the cord, or a hernial sac closed at its orifice.

We have two preparations, in the collection at St. Thomas's Hospital, of a cyst growing between the tunica vaginalis and the tunica albuginea, upon the surface of the testis. I have seen another example of the same kind.

Communicates with the Abdomen.—Hydrocele sometimes communicates with the abdomen : I have several times seen this circumstance in children ; occasionally also in the adult. The following is an interesting case of the former. Mr. Dobson, of Harlow, sent me a young gentleman with hydrocele, which communicated with the abdomen. I wrote to Mr. Dobson to the following effect : “ Our first step must be to apply a truss, and obliterate the communication of the tunica vaginalis with the abdomen, and then we will inject the hydrocele.” Many months afterwards, Mr. Dobson wrote me word that the truss had cured the hydrocele ; for that, when the opening of the tunica vaginalis was obliterated by its pressure, the water became entirely absorbed. Where hydrocele communicates with the abdomen, and there is abdominal dropsy, it is very convenient to tap the patient through the scrotum.

Usual Quantity of Fluid.—The usual quantity of fluid in hydrocele is from six to eight ounces ; but the largest hydrocele I have heard of was that of Mr. Gibbon, the historian, from whom Mr. Cline drew off six quarts of fluid : my colleague, Mr. Morgan, also mentioned to me a case of very great accumulation of water in hydrocele.

Varies in Appearance.—The fluid also varies in its appearance, although generally yellow, transparent, and saltish to the taste ; it sometimes contains a quantity of white flaky matter, produced by chronic inflammation, which I have seen more in the hydrocele of West Indians than in others.

When produced under acute inflammation of the testis, the fluid

is sometimes of a red colour, from a mixture of red particles of the blood.

I have also seen in the fluid of hydrocele loose cartilaginous bodies, of which we have a specimen in our collection at St. Thomas's Hospital. When hydrocele has existed a great length of time, the tunica vaginalis becomes thickened like parchment, and consequently opaque. Mr. Warner found a tunica vaginalis ossified. There is also one in that state in the collection at Guy's Hospital; and Mr. Beavers a pupil of Mr. Hey, of Leeds, gave me an example of one which he removed from the dead body.

DIAGNOSIS OF HYDROCELE.

Differs from Diseased Testicle.—Diseased testis is distinguishable from hydrocele by the latter being less heavy. The diseased testis is more flat on the sides than hydrocele, and more solid; pain is also produced by squeezing the testis; the epididymis is often capable of being felt as a distinct tumour; the cord may be traced with facility in the diseased testis; there is great vascularity of the scrotum; pain is felt in the loins generally; there is often the appearance of loss of health in disease of the testicle. A person comes into my room, and says, "Sir, I have a disease in my testicle." Looking at him, I am wont to say, if I observe the appearance of good health, "I doubt that, Sir;" and upon examination, usually find it to be hydrocele.

From Hernia.—From hernia it may be distinguished by the occasional return of the hernial swelling into the abdomen; by the dilatation of hernia in coughing; by hernia descending from the abdomen, and by hydrocele growing from below upwards. Hydrocele and hernia are, however, occasionally combined in the same individual, when the hydrocele is placed before the hernia. Hydrocele is sometimes met with below an adhering omental congenital hernia. Fluctuation and transparency are also diagnostic marks of hydrocele.

From Varicocele.—Hydrocele may be distinguished from varicocele by placing the patient in the recumbent posture in which varicocele disappears.

From Hæmatocele.—From hæmatocele it is difficult to distinguish it; but I will state the differences in the two diseases, when speaking of hæmatocele: here it will only be necessary to say, that hæmatocele is generally the result of a blow.

OF THE CAUSES OF HYDROCELE.

Dropsy generally, and this disease in particular, is often said to arise from increased secretion or diminished absorption, by which the question of its cause is really avoided:—for myself, I believe a diminished absorption is very rarely the cause of true dropsy. We do sometimes observe a leg or an arm swollen from enlargement of the absorbent

glands of the groin or axilla, but the swelling is very different to common œdema, being much more solid than dropsy usually is. But dropsical swellings generally are the result of an increased secretion from the arteries. The proofs of this are found in the increased vascularity of the membranous surface producing it, seen in the living or injected in the dead state; also in the changes in the membranes, produced in long continued dropsies; and in the quickness with which hydrocele succeeds inflammation of the testis and tunica vaginalis. Certainly, however, common hydrocele is rather the result of relaxation of the arteries, in which their mouths pour out more fluid, than it is the effect of inflammation. The absorbent vessels of the spermatic cord are very much larger in hydrocele than on the opposite and undiseased side.

Hydrocele is not unfrequently the effect of inflammation of the testicle, which, as it subsides, leaves the tunica vaginalis filled with serum, of a deeper colour than usual, and often slightly tinged with red particles.

Hydrocele is generally merely a local disease; but is sometimes connected with a general hydropic disposition.

OF THE NATURAL CURE OF HYDROCELE.

If an hydrocele be suffered to remain and to become of large size; if the patient be under the necessity of labour to obtain subsistence, inflammation of the tunica vaginalis and scrotum will arise from excessive distension. A slough of the scrotum and tunica vaginalis is produced, and, as it separates, the water escapes: a suppurative inflammation succeeds, granulations arise, and the patient in this way receives his cure.

Case.—Hydrocele is not always cured by a blow which tears the tunica vaginalis. I once attended a gentleman, who consulted me for an hydrocele; and who, whilst riding in the neighbourhood of Gibraltar, was thrown forward upon the pommel of his saddle, and received a severe blow on the scrotum. The hydrocele disappeared, but in six months again formed, and was, he thought, as large as before. I injected it about two years from the accident.

OF THE CURE OF HYDROCELE BY ABSORPTION.

In Children.—This disease is, in young people, very generally curable by absorption. If a child be brought to me with hydrocele, I direct a little calomel and rhubarb occasionally, and order a suspensory bandage, which is to be kept wet with the muriate of ammonia and liquor ammoniæ acetatis, in the proportion of ℥ij of the former to ℥vj of the latter. This, after a short time, produces excoriation, and leads

to the absorption of the fluid. The tinctura lyttæ may be added, if the fluid does not absorb quickly.

When hydrocele is the result of inflammation of the testis, the same mode of treatment often succeeds in the adult, in promoting absorption of the fluid, viz., giving submuriæ hydrargyri c. extract; colocynth: comp: and applying an irritating lotion to the part. These applications have, however, no power over the common hydrocele of the adult, and I have tried continued blistering without benefit.

OF TAPPING FOR HYDROCELE.

When the general health forbids an operation, which, although mild, is attended in some constitutions with risk, if a patient's fears prevent him from submitting to a more effectual treatment, or when it is inconvenient to him to undergo any other operation: the water is removed by tapping.

Instruments.—The instruments required are a trocar and canula. The canula two inches long, and the eighth of an inch in diameter. A lancet only is sometimes employed; but it is an inconvenient instrument, leading to difficulty in evacuating the whole of the water, and to bleeding into the tunica vaginalis after the operation.

Mode of Operating.—The mode of performing this operation is as follows: The person is to stand before the surgeon, who grasps the scrotum and swelling with his left hand, and introduces the trocar two thirds of the length of the swelling downwards, and not directly horizontally, but with a slight obliquity upwards. When the canula has entered the tunica vaginalis, the trocar is withdrawn, and the canula is then passed further into the tunica vaginalis, and the water escapes.

The swelling is grasped, that the fore part of the scrotum and tunica vaginalis may be put upon the stretch, when the trocar enters easily.

The trocar should be directed slightly upwards, and then the testicle is not in danger of injury, which it will be if the trocar be entered horizontally; and the canula is further introduced when the trocar is withdrawn, by which a wound of the spermatic cord or testicle will be effectually prevented. When the water has been removed, and the canula is withdrawn, a small piece of adhesive plaster should be laid over the wound, and a suspensory bandage be applied.

Sometimes succeeds in curing.—This operation sometimes succeeds in preventing a return of the disease, although very rarely; but to give the patient the best prospect of it, a strong stimulating lotion may be immediately applied.

Exercise sometimes produces inflammation. I have known a person who had been tapped in the morning, get into a coach at night to go to Manchester, and have sufficient inflammation produced to effect a cure.

Time in which it forms again.—As in very few cases inflammation succeeds, or a cure is produced by this operation, the patient

returns in a few months for its repetition ; but the time of reaccumulation is very uncertain.

If the disease very soon reappear, it is a proof of an hydropic disposition, and it is right to give submuriæ hydrargyri, with squills, at night, and tincture of digitalis spiritus ætheris nitrici and mistura camphorata twice in the day.

Not devoid of Danger.—This apparently trifling operation is not entirely unattended with danger, as the following case proves :

Case.—Mr. Somersett, an aged gentleman, came to town from Wiltshire, to undergo this operation ; and on the evening of the day in which it was performed, he took a long walk. On the following day but one there was considerable inflammation in the scrotum, and his son, who was my dresser, advised him to rest and suspend the part. The inflammation, however, proceeded, and in a week he expired ; gangrene having been produced in the scrotum to a considerable extent. Well may it be said in our profession, "There are some you must not touch, there are others you cannot kill." Mr. Green, of Lewisham, has published a case of a similar kind, which I had an opportunity of witnessing.

LECTURE XVII.

OF THE OPERATIONS FOR THE CURE OF HYDROCELE.

VARIOUS have been the operations advised and resorted to for the cure of this disease : some very severe, others very uncertain in their issue. The excision of the tunica vaginalis to greater or less extent was practised by surgeons forty or fifty years ago : an operation which I have seen two or three times performed, but which I hope never to witness again ; painful in its performance, and violent in its consequences, beyond what this disease (which is little more than an inconvenience) will warrant. A second operation consisted in passing a tent into an opening in the tunica vaginalis, which produced inflammation, but, from the adhesion being partial, it often did not prevent a return of the disease. Thirdly, caustic was used, potassa fusa was applied to the scrotum, and rubbed upon the part, until its influence reached the tunica vaginalis, destroying its life and texture ; this, when well managed, was a very successful operation ; but it required great attention in its use, and I have known it, in a diseased constitution, destroy life.

Different Operations.—The operations to which I have occasionally recourse, are three ; 1st, Injection ; 2d, Seton ; 3d, Incision. The object of the two former is, to excite adhesive inflammation, and

to change the action of the part, so as to prevent further secretion ; in the latter, to fill the cavity with granulations.

Injection.—For the operation by injection we are indebted to Sir James Earle ; and those who are old enough to remember the contrariety of opinion on the treatment of hydrocele ; how one surgeon advocated seton, another caustic, a third incision ; well know how to appreciate the proposal of Sir James Earle, and must be aware how much our profession and mankind are indebted to him for his suggestion.

Instruments required.—The apparatus which is required for this operation is an elastic gum bottle, to contain about six ounces of fluid, fitted with a brass cylinder to receive a stop cock, which can be attached at pleasure. A trocar and a canula two inches long are also required.

Fluids injected.—The fluid which is used as an injection is, either equal parts of port wine and water, or sometimes, when a person has been very unirritable, and the operation has failed, two thirds of wine and one third of water, or 3j of zinci sulphas to ℥j of water, or one sixth of spir: vini to five sixths of water. Cold water itself succeeds often very well, but I have known it fail.

Mode of operating.—The patient is placed in a recumbent posture upon a sofa or chairs, and the surgeon sits by his side ; the tumour is lightly grasped by the left hand of the surgeon, and the trocar is thrust in gradually and obliquely. It should enter two thirds of the swelling downwards, and be directed not immediately downwards to the testicle, but a little upwards, so that if it penetrated it would pass more than one third of the swelling downwards. The trocar and canula having entered the tunica vaginalis, the trocar is withdrawn, and in doing this the surgeon not only nips the scrotum, but the tunica vaginalis around the canula, to confine it within the bag ; and when the trocar is withdrawn, he pushes the canula to its hilt within the tunic. The water then escapes into a basin provided for the purpose. The surgeon putting the stop cock into the elastic bottle, introduces the stop cock on the canula, and the contents of the bottle are then thrown into the tunica vaginalis ; great care being taken to nip the tunic upon the canula ; the bottle is then removed, the stop cock remaining upon the canula. The patient soon feels pain in his groin, next in the spinous process of the ilium, and then in the loins, sometimes the neck of the bladder suffers. The fluid is to be withdrawn at the end of five minutes, and then the operation is completed.

Time the Injection is to be retained.—Although, as a general rule, five minutes are occupied in the retention of the injection, yet it may be observed, that the suffering is sometimes so considerable, that a surgeon might be tempted to believe that the fluid should be sooner removed ; but the succeeding inflammation is not at all commensurate with the previous irritation : those who suffer the most at the time of injecting, have often the least inflammation, and I am, therefore, dis-

posed to continue it the same in all adults. In the young, three minutes will suffice.

Tunic not to be distended by the Injection.—I never distend the tunica vaginalis with the injection, but throw in less fluid than was removed from the hydrocele, and move it in the tunica vaginalis, so as to make it apply itself to every part of the surface. If much be injected, the cremaster contracts, and forces a part of it by the side of the canula into the cellular membrane of the scrotum.

Slight Enlargement of the Testicle.—If, when I have drawn off the water, I find the testis somewhat enlarged, it does not prevent my proceeding with the operation ; for I find the excitement which it produces often diminishes the testis, and does not prevent the success of the operation.

After-treatment.—When the operation is concluded, much depends upon the after-treatment to render its issue successful. The suspensory bandage is not to be reapplied, and the rules laid down for the patient are these : If you are in much pain, lie down ; if you suffer but little, take exercise ; if you be in much pain, eat very little and drink only diluents ; if you suffer but little, take your dinner and two or three glasses of wine ; come to me to-morrow ; if then, there be redness in the scrotum, considerable tenderness, and some swelling, you direct the suspensory bandage to be worn, the exercise to be moderated, and the diet to be light ; but if there be little appearance of inflammation, it is right to grasp the scrotum in one hand, and with the other to gently tap it a few times with the fingers to produce slight pain. Recommend exercise and a generous diet, until redness of the scrotum, swelling, and pain in the part be produced ; for the inflammatory swelling from the injection should be nearly as great as that which had previously existed from the disease.

The swelling continues increasing for a week, is stationary for a few days, and then declines, so that in three weeks it has subsided ; the operation rarely requires a confinement of more than a few hours ; sometimes it does so for a week, but, in general, I say to my patients, after four days you will be walking about again ; and then if they are not confined at all, they are much gratified.

Operation fails.—This operation sometimes fails in producing sufficient inflammation to effect a cure. I once asked Sir James Earle if he did not fail sometimes ; and he said, scarcely ever ; this is quite contrary to my experience ; for I sometimes fail, and should very often, but for great care in the after-treatment, upon which, I think, much depends. I sometimes, when water is reproduced a few days after the operation, tap it to remove the serum, and to produce, by this operation, a larger share of inflammation.

From Suppuration.—I have seen suppuration, after injection, in very irritable persons ; and in cases in which the hydrocele has been the result of inflammation, and the inflammation of the tunica vaginalis had not completely subsided. It occasions delay, makes the operation much more painful, and renders confinement necessary, but it makes

the cure more certain. A young man, about twenty years of age, came to me in Spring Gardens, with an hydrocele on each side. He resided in Long Lane in the Borough, a distance of two miles from my house. I injected one of the swellings with equal parts of port wine and water, and sent him home. I was sent for to him on account of a high degree of inflammation, which proceeded to suppuration, and which I imputed to suffering him to go to a distance directly after the operation. When he had recovered from this operation, I injected the other at his own house, and directed him to keep his bed, and used the same strength of injection as before, yet this hydrocele suppurated also.

Case.—I was once called in consultation a few miles into the country respecting a gentleman, whose hydrocele had been injected in London, and who was suffered to return home afterwards, and the tunica vaginalis suppurated.

When cysts grow between the tunica vaginalis and tunica albuginea, the operation will necessarily occasionally fail.

Danger of Injecting.—The operation of injection is not entirely without danger, and the danger consists in throwing the injection into the cellular membrane of the scrotum. I have seen many cases in which extensive sloughs were produced, and the following is a case well worthy attention.

Case.—A man had been under my care in Guy's Hospital for hydrocele, which I injected, and failed in producing a cure. The man, two years afterwards, was admitted under the care of one of my colleagues. I spoke to the man, and examined him; the case was decidedly hydrocele, in the same side as before. About a fortnight after, as I passed through the same ward, I said to one of the gentlemen by my side, "Mr. Godfrey, where is the man with hydrocele?"—"Sir," said he, "he has quitted the Hospital."—"Indeed," I said, "why?" No answer was made. As I was returning over London Bridge, in my way to the city, Mr. Godfrey joined me, and said, "Sir, I beg your pardon for telling you the man had quitted the Hospital; but the fact is he is dead. The dresser of the surgeon under whose care he was, attempted to inject the hydrocele, by the permission of the surgeon: he threw in the fluid with great difficulty, and only after repeated efforts; the man complained violently, and when the injection was attempted to be withdrawn, it would not escape; in short, it had entered the cellular membrane only; violent inflammation and gangrene ensued, and the man died in a week." This circumstance happened from the canula not being passed into the tunica vaginalis, so that the injection never entered it; and even if the canula has entered the tunic, and is not confined there by pinching the tunica vaginalis around it, it is apt to slip out. This was the reason why I mentioned the care which was necessary to push the canula home, and to pinch the tunica vaginalis round it.

Mode in which the Cure is effected.—The mode in which the cure is generally effected is, by the effusion of serum and fibrin into

the tunica vaginalis ; the serum becomes absorbed, and the fibrin glues the sides of the tunic together, and is also at length in a great degree absorbed ; but this effusion is not necessary to the cure, which seems, in some cases, to be effected by a change of action in the vessels.

Case.—A captain in the coasting trade came to me with hydrocele, which I injected, and cured him. Some years afterwards, I attended him with Mr. Holt, surgeon, for a disease, of which he died. I requested of Mr. Holt to take away the testicle and tunica vaginalis after death ; which he did, and it is now in the collection of St. Thomas's Hospital. The tunic had adhered very partially, it was more relaxed than usual, but did not contain water ; so that from change of action, or effusion on the mouths of the vessels, it had ceased to be a secreting surface.

OF THE OPERATION BY INCISION.

When some obscurity hangs over the nature of the case as to its being connected with hernia, or some enlargement or disease in the testicle, it is sometimes, though rarely, necessary to open the tunica vaginalis.

Operation.—This is done by beginning an incision at the upper part of the swelling, and extending it two thirds downwards ; for if it be made to the lower part of the tunica vaginalis, it leaves the testis too much exposed, and produces excessive inflammation in it. The water being evacuated, and the state of the testis learnt, as well as if there be any disease connected with it (as cysts on the testis), a little common flour is sprinkled in, and thus the surface is forced to granulate, and any return of the disease is sure to be prevented ; very seldom, however, is such an operation required ; and it ought not to be had recourse to but in cases of great doubt with respect to the disease, as it is one of great severity. After this operation a poultice only should be applied, and the cure is effected by suppuration and granulation.

OF THE SETON FOR THE CURE OF HYDROCELE.

In cases in which hydrocele will not yield to stimulating lotions, used with a view to produce absorption in very young persons, I prefer to the operation of injection the following plan:

I pass a common curved needle and thread through the hydrocele transversely, about half way from the upper to the lower part of the swelling, including about an inch and a half of integument, and one inch of tunica vaginalis. I then tie the thread with a knot, leaving it loosely hanging in the tunica vaginalis and scrotum. No confinement is necessary ; the child runs about as usual, until the part reddens, swells, and becomes hard, which is about a week : and at the end of

that time I withdraw the thread, and the adhesive inflammation produces the cure.

I sometimes, in the adult, adopt the same plan when the injection has not produced sufficient inflammation, and it prevents the necessity of any further operation.

HYDROCELE OF THE SPERMATIC CORD.

This disease is rather of rare occurrence. It may be defined to be an accumulation of fluid in the tunica vaginalis of the spermatic cord.

How formed.—The complaint is founded upon the following circumstance: When the testis descends from the abdomen, the spermatic cord is closely invested by peritoneum, which adheres to its vessels; but the portion of peritoneum which descends with the testis from the lower part of the abdomen, does not, at first, adhere to the cord, but a channel, admitting of a probe, is left between the two portions; so that the tunica vaginalis is, at first, open to the abdomen from the testicle upwards. But after a time adhesion is produced of the tunica vaginalis from the place at which the spermatic cord quits the abdomen nearly to the testis, and the two portions appear as one. Sometimes, however, it happens, that in some part of the cord the adhesion is not complete, and then a space is left, in which a slight secretion proceeds, and which, accumulated or increased, produces at this part a hydrocele of the cord.

The swelling when seated above the abdominal ring, is easily distinguished from others. It is globular, and when grasped and raised, it appears of a slight blue colour; it is very transparent; extremely firm to the feel; is unattended with pain; it rarely acquires any considerable size, and is merely an inconvenience to the patient from the impression it produces in his mind.

Difficult to distinguish from Hernia.—When this swelling is seated in the spermatic cord above the abdominal ring, it is very difficult to distinguish it from hernia; for it disappears under pressure, is very apparent in the erect, and almost disappears in the recumbent posture; but there is no pain, no gurgling, no interruption to the bowels from the tumour. The disease in this situation feels like a bullet lodged in the cord,—left to itself it increases, and at last emerges at the ring, when its transparency decides its nature.

Treatment.—In the treatment of this disease it may be injected, or an incision be made into it, or a seton introduced.

I am of opinion it is best not to inject them; for it is with difficulty done, and the disease is apt to return; this has happened to myself; and the following case, which had been under the care of a very intelligent surgeon, Mr. Pulley, of Bedford, is a proof that it happened to another.

Case.—Master —, of Bedford, had a hydrocele of the cord, of six

years' duration : it appeared in part above, but the greater part just below the ring ; it was very transparent. Mr. Pulley tapped it, and it formed again immediately. Mr. P. has twice injected it—once five years ago, and secondly, two years and a half since, but the disease returned. I cured it by making an incision, and introducing flour, but two abscesses formed during the cure.

A seton made by introducing a common curved needle carrying a single silk, is a more lenient cure.

A hydrocele sometimes, I believe, forms on the cord from a secretion, proceeding into a hernial sac shut at its orifice to the abdomen.

ON HÆMATOCELE.

Hæmatocele is a collection of blood in the tunica vaginalis testis. The tumour is pyriform like hydrocele, is not painful, does not affect the general health, and is attended with slight fluctuation, but it is not in the least transparent.

Distinguished from Hydrocele.—It is distinguishable from hydrocele by its weight being greater, by its want of transparency, by its obscure fluctuation, but most easily by its being usually the sudden result of a blow upon the part.

Case.—A man came to my house in the country with a pyriform swelling of the scrotum, which, he said, had been the result of his being thrown in riding upon the pommel of the saddle, and that, at first, the scrotum had been also severely bruised, and was of various colours from extravasated blood. I made an incision into the tunica vaginalis, and discharged a large quantity of brown-coloured fluid blood, and large coagula changed in colour by long retention ; I then ordered a poultice, to produce suppuration in the tunica vaginalis.

Case.—Mr. W. was brought to my house by Mr. Harris, surgeon, of Gracechurch Street, with a pyriform swelling of the scrotum, produced by a blow fifteen years before ; and it increased progressively to the time at which I saw him. The testis and epididymis could be felt at the lower part of the swelling, and above it to the ring a solid substance, mixed with a fluid ; the swelling was not in the least transparent, and he had never suffered pain in it. I opened the swelling at my house, Sept. 23, 1822, and discharged a greenish dark-coloured fluid blood, and solid substance of a slightly yellow colour. The tunica vaginalis was excessively thickened, looking like the densest parchment. He went home in a coach, which was about three miles ; and on the same day, when imprudently sitting in his counting house, he was seized with a profuse hæmorrhage from the tunica vaginalis, and fainted : he was carried to bed, and he had violent constitutional irritation, with suppuration of the tunica vaginalis ; but he did well.

Sometimes follows Hydrocele.—Hæmatocele now and then follows tapping in hydrocele, more especially if a lancet be used. Mr. Sherwood, of Reading, informed me, that a hydrocele being tapped, some blood escaped after the canula was withdrawn.

The lips of the wound were united, and some time after a fresh hydrocele appeared to be formed, and was to be operated upon by injection ; but upon passing the trocar, the tunica vaginalis was found full of blood. An incision was made into the tunica vaginalis, the blood was discharged, and the patient was cured.

Case.—Mr. Lewis, surgeon, in Mark Lane, had a patient whom he had twice tapped for hydrocele. About two months after the last operation, he returned with the appearance of a renewed disease, only that the swelling was somewhat rounder. Mr. Lewis again tapped, and drew off a pint of thick bloody fluid. In a fortnight the swelling reappeared, has never increased, but is gradually absorbing.

Case.—Hæmatocele is sometimes founded on hydrocele. A man was brought into Guy's Hospital, who had long had a hydrocele, who had received a severe blow upon it, which suddenly increased the swelling, bruised the scrotum, and produced great pain from distension. I made an incision into it, discharged a large quantity of water, and of coagulated blood, and found a rent in the tunica vaginalis about two inches long, covered with coagulated blood.

Case.—Dr. Saunders, formerly teacher of medicine at Guy's Hospital, had a hydrocele, for which he applied occasionally to Mr. Lucas, my colleague at Guy's, to have it tapped. In stepping upon a chair to reach a book, he fell against the back of the chair, and received a blow upon the scrotum, which led to the recurrence, as he thought, of his hydrocele, and in a few days he went to Mr. Lucas to have it tapped, but upon the introduction of the trocar no water passed ; the doctor then consulted several surgeons ; and at length, Mr. Cline made an incision into the part, and the tunica vaginalis was found full of coagulated blood, which was discharged, a poultice applied, and he soon recovered.

Not always produced by a Blow.—Hæmatocele is not always produced by a blow. I attended, with Mr. Hicks, in Bond Street, a gentleman, who had a large pyriform swelling in the left tunica vaginalis, which never had been painful, and which had an obscure fluctuation. I made an incision into the swelling, in the presence of Mr. Hicks, and discharged near a pint of fluid blood. This swelling had not succeeded a blow, but Mr. Hicks imputed it to excessive exertions this gentleman had been in the habit of making.

We have in the collection at St. Thomas's Hospital a hæmatocele, in which the testicle was removed by mistake. The case assumed the symptoms and feel of a diseased testis, and the surgeon determined upon its removal. I took it to St. Thomas's to dissect, for the surgeon who had removed it had not even the curiosity to examine the disease. When I opened the tunica vaginalis I found it most excessively thickened, and filled with coagulated blood of a brownish red colour. The testicle was placed at the posterior and lower part of the swelling.

LECTURE XVIII.

ON THE DISEASES OF THE TESTICLE.

THAT change to which the testicle is sometimes, but not very frequently subject, viz., the formation of a number of cysts or hydatids within its substance, is the disease which I shall first describe.

OF THE HYDATID OR ENCYSTED TESTIS.

Age at which it occurs.—This change in the testicle is usually observed in the earlier periods of life, generally from eighteen to thirty-five years, although I have seen it occur at forty-nine years. It has been said to begin in an enlargement at the end of the epididymis; but of the part in which it commences I am by no means certain, whether in the testis or in the epididymis; for the enlargement is so gradual and imperceptible, that it is usually discovered by accident. The disease is generally unattended with pain, nor does the patient complain of any tenderness in the part when it is handled. It does not seem to be produced by or attended with any constitutional disease, for the appearance of the person is sometimes that of robust health. There is no redness of the scrotum, but the veins of the spermatic cord are, in some instances, very much distended with blood, so as to be varicose. The form of the swelling is that of the testicle, rounded upon its fore part, and flattened upon its sides, rather than pyriform like hydrocele. The epididymis, under the greatest enlargement, can be distinguished by its swelling from the testis by a line of separation between them. The disease is attended with obscure fluctuation, but it is rather a yielding at the part compressed with the finger, than an extensive fluctuation from one extremity of the swelling to the other. If the diseased part be firmly compressed, it gives the sensation of squeezing the testis; it gradually increases until it acquires great size, and then its weight becomes very inconvenient, and the disease produces considerable uneasiness in the loins, from the testicle stretching the nerve of the spermatic plexus. On these accounts, viz., the size it acquires, and the pain which its weight produces, the patient becomes anxious for its removal.

I have never seen this disease affect the spermatic cord to the abdomen, or extend its influence beyond the testicle and epididymis.

ON THE DISSECTION OF THIS DISEASE.

On cutting into the part after its removal, the tunica vaginalis is found to be a little thicker, and the tunica albuginea is much denser than natural. The testis is in its interior, is filled with numerous cysts of various sizes, some small as the heads of pins, others of the size of peas, and the largest about an inch in diameter : as they vary in size, so the fluid which they contain differs in appearance—the smallest contain a watery fluid, transparent, and without colour ; the larger appear to be filled with serum ; and the largest, when opened, discharge mucus with some pus, as they have undergone a partial suppuration. I have seen in these cysts a true hydatid contained in the fluid, like that which is frequently found in the liver. The cysts are highly vascular, and their appearance is very beautiful when the serum is seen through a highly vascular cyst. The glandular structure of the testis seems to be in a great measure destroyed. The appearances in the epididymis are of a similar kind, only that the cysts do not acquire the same magnitude.

OF THE DIAGNOSIS OF THE HYDATID TESTIS.

Mistaken for Hydrocele.—This disease is often mistaken for hydrocele ; and it must be confessed, that they are with great difficulty distinguished from each other. I do not believe that there is any surgeon, who is candid, and who has had such opportunities as the surgeons of the large Hospitals possess of witnessing disease, who will not confess he has mistaken this disease in the testicle for hydrocele, and plunged a lancet into it, and has been surprised to find, that a little water and blood only have followed.

Marks of Distinction.—The marks of distinction are a less extensive fluctuation, a much heavier swelling, rounded upon the fore part, and flattened upon the sides ; the entire absence of transparency ; the sensation of the testis being squeezed under pressure ; the varicose state of the vessels of the cord and dilated veins of the scrotum ; a division of the swelling into two, viz., testis and epididymis. Testis not felt as in hydrocele.

CASE I.

Charles Demby, aged forty-nine, was admitted into Guy's Hospital, 23d of May, 1804, with enlargement of the testis. It began two years before in a diminution of the left testis, accompanied by a sense of weakness on the left side ; it afterwards gradually became larger than the other ; and he applied, three quarters of a year after discovering this increase, to a surgeon of the first talent and respectability in the neighbourhood of London, who introduced a trocar into the testis, and a little water was observed to issue, but the quantity was very small. He immediately pronounced it a case of hydatid testicle : as it still

continued to increase, the patient applied for admission into Guy's Hospital. On the 29th of May I removed the testis, and upon cutting into it I found a purulent fluid in some of the cysts, and the appearances which I have described in others. The wound quickly healed, and he was discharged on the 16th of June, having thus early entirely recovered.

CASE II.

Mr. Davie, surgeon, brought me a testis from a subject in the dissecting-room, in which one of the globular hydatids was lodged. It was enclosed in a distinct cyst, produced by adhesive inflammation; the hydatid itself exactly resembled that which is so frequently met with in cysts of the liver.

CASE III.

Bartholomew Lupre, aged thirty, an Italian sailor, was admitted into Guy's Hospital in April, 1809, with an enlarged testis, which he reported began four or five months previously; the cause was unknown, but he supposed that it arose from a cold, produced by his wearing wet clothes; the veins of the scrotum were much loaded with blood, and those of the spermatic cord were very varicose. This man suffered considerable pain in his loins from the weight of the swelling. I performed the operation of removing the testicle, and found it, upon dissection, full of cysts of various magnitude.

CASE IV.

A young medical man called upon me with enlargement of the testis, unattended with pain; its increase was gradual, its weight was considerable, its fluctuation obscure; the general health was good. Mr. Guthrie removed the testis, which I examined, and found to be of the hydatid or encysted kind: he gradually recovered.

Cause.—The cause of this disease is unknown, and I shall not indulge in speculation, which would probably be unsatisfactory for want of proof, and useless in preventing the occurrence of the disease, if clearly developed.

The operation for the hydatid disease is required from the inconvenience resulting from its size, and from the pain in the loins produced by its weight. A quantity of blood should be taken from the arm; the patient briskly purged for a few days, and animal food refused for a week before the operation. I have never known a patient do otherwise than well under the removal of the testicle for this disease.

No Danger of return, if removed.—You may confidently also assure your patient, that there is no remote danger of returning disease; for in no instance has there, within my knowledge, been any extension of the complaint to the abdomen by the absorbent vessels.

It is right to state, however, that I once saw in Mr. Moorhouse, a medical gentleman who died of a fungous testicle, which extended into the abdomen; in some parts of the testicle numerous hydatid cysts mixed with the morbid fungus or medullary structure; so it seems that the two diseases may be combined in the same individual.

OF THE MALIGNANT DISEASES OF THE TESTIS.

The testicle is subject to two diseases of a malignant character : viz., the fungus and the schirrus disease : of which the former is by far the most frequent.

OF THE FUNGUS, MEDULLARY OR PULPY DISEASE OF THE TESTIS.

Under these various names has this disease been described—fungus, because when it ulcerates, a large fungous projection forms from it ; medullary, because it has somewhat the appearance of the brain in a putrid state ; pulpy, because it is soft, and easily breaks down to pressure. It has been often also called the soft cancer, on account of some resemblance it bears to cancerous affections, although its texture is of a much softer consistence.

Symptoms.—The symptoms of this complaint are as follow : It begins in an enlargement in the body of the testicle, which is, at first, accompanied with great hardness, and the form of the swelling is more globular than that of the testis in its natural state. The epididymis becomes soon affected after the disease has shown itself in the testis ; the enlargement proceeds generally rapidly, although, in some cases, it varies in that respect. The pain which attends it, is at first only occasional, and not severe. Slight causes, as a catarrh, or more than usual exertion, increase its size ; but by rest, the enlargement subsides nearly to its former state : it soon becomes of the size of a small orange and of its globular shape : it feels very hard, but is free from tenderness when pressed ; it at length forms adhesions to the surrounding parts, so that the scrotum, after a time, is only moveable over it at some points. It is, at first, regular on its surface ; after a time the cord enlarges above the abdominal ring, and at length it contracts adhesions to the pubis. At first the scrotum is not inflamed, although the vessels are somewhat larger. A gland or glands become enlarged in the groin, unattended with pain after the testis has adhered to the scrotum, and which gradually increase. An absorbent gland also generally enlarges on the opposite side to that in which the disease begins. The disease extends by absorption into the abdomen, before the testis adheres to the tunica vaginalis and scrotum, and produces a cord which may be traced upon the psoas muscle by deep pressure to the region of the kidney, where it produces, just below the emulgent artery, a tumour, readily felt by pressure, when the abdominal muscles are relaxed by bending the body in the recumbent posture.

Constitutional Affection.—At first the constitution does not suffer, although the countenance of these persons is generally sallow at the very dawn of the disease, showing that the general health is in some degree defective. There is, sometimes, uneasiness in the loins, and sharp pricking pains in the thighs and legs ; and as the disease

advances, the leg, thigh, and foot, on the diseased side, become œdematous, and feel weak. For some time before death the patient loses his appetite, and gets but little sleep : he has profuse perspiration ; the bowels are generally very irregular, as the tumour on the abdomen increases, though prior to that time they are regular, and there is sometimes an irritability of the bladder, and frequent inclination to make water. The iliac glands are also enlarged above Poupart's ligament.

Period in which it proves Destructive.—I have known the disease very rapid in its progress, terminating the patient's existence in a few months ; but I have also known it two years in one case, five years in another, and fourteen in a third. The fact is, that a simple chronic disease in the testicle will remain stationary for a length of time, if the constitution be tolerably good ; but if it become deranged, a malignant action is produced, and the disease assumes the character of the complaint I am describing.* The testis in this disease has often a disposition to ulcerate ; the scrotum adheres to the tunica vaginalis, and assumes a livid hue. A sense of fluctuation is produced, so that it might be supposed to contain a fluid ; ulceration begins in the scrotum, and through the opening a fungous substance projects, which discharges a very large quantity of watery fluid ; bleedings occasionally ensue from this fungus. If the testicle be pressed, a quantity of matter which looks like putrid brain issues ; the fungus sloughs, then the part discharges profusely, bleeds, and again sloughs, until the patient is exhausted by irritation and discharge. Towards the close of life the pain is often excessively severe in the part, in the abdomen it is occasional only ; and the patient has vomiting, and frequent attacks of

* This is well illustrated by the following case : James Verrell, æt. 26, employed as a musician at one of the theatres, in the spring of 1823, contracted a gonorrhœa, for the fourth time, which, in three or four weeks, gave rise to an inflammation and enlargement of the testicle ; for this he applied evaporating lotions, and kept at rest, and by these means reduced the inflammatory symptoms ; but the testicle still remained hard and much larger than in the natural state. He then returned to his usual mode of living, which was very irregular, and in the following October the testicle became farther enlarged, particularly at the posterior part, and it continued gradually to increase in size, until his admission into St. Thomas's Hospital, on April the 8th, 1824. The following is an account of the symptoms and appearances at that time. His countenance sallow, secretions irregular, and much general constitutional derangement, with occasional severe pain in the affected part, extending to the loins. The testicle was about the size of a large orange, somewhat uneven on its surface, feeling extremely hard in some parts, and in others soft and fluctuating. The usual remedies for chronic diseases were employed without producing any alteration in the disease, when, by the advice of my colleagues and myself, he consented to have it excised. This I did for him in the usual way : and on examining the diseased testicle, after its removal, I found the substance of the gland converted into a soft, pulpy, or medullary matter, in the centre of which was a small abscess ; the epididymis presented a hard mass, like scirrhus, and had numerous portions of cartilage deposited in it, and at its upper part was a bunch of hydatids.

After the operation, he had a severe attack of peritonitis, which was subdued by active treatment, and he left the Hospital much improved in health, with the wound quite closed.

diarrhœa. I have known a person just before death have the following symptoms, vomiting, hiccough, violent pain in the abdomen, swelling of the legs and thighs, tumour in the abdomen, and pain with tenderness on pressure over the abdominal muscles.

DISSECTION.

The testicle in these cases varies in its appearance according to the stage of the disease. A secretion of a soft pulpy matter, looking something like brain, is found deposited in the midst of the semeniferous tubes in its early stages; and as the disease advances, and the testicle becomes enlarged, the semeniferous tubes are absorbed, and the peculiar secretion of this disease occupies their natural situation. I have injected several of these diseases, and we have beautiful specimens of them in the collection. The secreted solid substance is very partially vascular; in some parts the vessels are very numerous, in others they do not enter the disease; those which do, are so tender in their coats, that they readily give way to very slight force; when ulcerated the fungus is found very vascular, other parts of the tumour appear broken down, so as to have lost their organization, and resemble cream; portions of the substance are solid like brain, but in separate masses; some have often also a woolly or flocculent appearance.

The true Nature of the Disease.—The true history of the disease appears to consist in the part secreting, not common fibrous or adhesive matter, but a material of much softer consistence scarcely supporting vessels in some parts, whilst in others there is a rapid growth of the blood-vessels: in one case, therefore, it falls readily into disorganization; in another, produces a projecting fungus so soon as ulceration allows the vessels a less limited growth; but more of this hereafter. In some parts we find coagulated blood mixed with the matter effused, and in others small collections of serum.

Disease in the Spermatic Cord.—In the dissection of the body the spermatic cord is tuberculated with fungous tumours, which contain a soft white pulpy mass; and similar swellings adhere to the peritoneum within the abdomen. A tumour is found on the loins, reaching from thence upwards, behind the intestines, to the kidney. It covers the aorta and vena cava, and the kidney adheres to it: when cut into, there issues from the tumour a considerable quantity of matter which looks like thick cream, mixed with a small quantity of the colouring parts of the blood. The mesenteric glands are enlarged; the liver has tubercles in it; the thoracic duct is sometimes obstructed by a fungus or medullary secretion on it; the duodenum passes over, adheres to the tumour, and is narrowed by it, and the aorta and cava also adhere to it posteriorly. The coats of the aorta and vena cava become diseased.

OF THE DIAGNOSIS OF THIS DISEASE.

Difference from Hydrocele.—This is a difficult task. From hydrocele, the want of transparency; the more globular form of the swelling; the pain which occasionally attends it; its yielding, rather than extensively fluctuating, and the appearance of want of general health, become the means of distinguishing it.

From Hydatid Testicle.—But from the hydatid testicle, when this disease arrives at the pulpy state, the distinction is much more difficult, and the most experienced are liable to err. Pain in the part occurring at distant intervals; a sallow complexion, and the appearance of deficient general health are the criteria; but still I have known the best surgeons mistaken. I really am decidedly of opinion, that in hydrocele, hydatid, or fungous testis, no objection exists to introducing a lancet to discover the real nature of the disease. If it be hydrocele, the rush of water directly proves its nature. If it be the hydatid swelling, a little water, mucus, and blood escape; and if medullary, blood only; sometimes a little brain-like substance appears upon the lancet, which immediately informs the surgeon of the true form of the complaint. It does no mischief in the cases which it cannot relieve, and without it the surgeon's reputation is endangered, if he gives a rash opinion upon the nature of the disease.

OF THE CAUSE OF THIS DISEASE.

Deranged state of Constitution.—This disease arises from a defective state of the constitution: it generally occurs in persons naturally feeble, and in those who are irritable, both in body and mind. They are subject to slight feverish attacks, to irregular secretions, to defective digestion; the former producing new and disordered actions; the latter leading to an unhealthy state of blood in which the quantity of serum is large, and the fibrous part of the blood small in quantity, and loose in texture. But independent of the state of constitution, there is also an altered local action: if the parts inflamed from this disease are cut into, a fungous structure will be produced from the wound: but if the contaminated parts are entirely removed, the wound heals as any other wound in the body without any such morbid appearance.

OF THE TREATMENT OF THIS DISEASE.

Medicines of no Service.—No medicine has been yet discovered which has any influence over this disease, when it has been once formed. The common remedies used for the preservation of the general health may, by improving the constitution, lessen or prevent

the tendency to the disease ; but no medicine has any influence upon it when the local disease has once appeared. The pil: hydr: submuriatis composita given at night, and infus: cascarillæ, soda, rhubarb, and ammonia, given bis die, or hyd. c. creta, soda, and rhubarb, are the best medicines to improve the constitution ; yet we ought to look further, to try to discover, amidst the numerous new articles which chemistry and the extension of botanical knowledge have given, if some specific remedy cannot be discovered for this disease. The local remedies hitherto employed have been equally inefficacious. Leeches and evaporating lotions, upon general principles, retard the progress of the disease, but nothing has any specific power in changing the action of the part: when ulcerated, solutions of alum, of sulphate of zinc and of copper, and diluted nitric and sulphuric acid are of some use. All, then, that is left to the surgeon is to improve the constitution first, next to effect the removal of the disease by the knife ; and when this has been done, to give such medicines, and rules of living, as shall, by improving and preserving the health, change the constitution, and lessen the disposition to the return of this disease.

Operation uncertain.—The removal of this disease by operation is very often unsuccessful, as the disease is very apt to return in the part, or in some distant organ of the body, if a constitutional treatment is not previously and even afterwards pursued. I removed in a patient of Mr. Sterry, in Bermondsey, a fungous ulcer from the shoulder, and the disease soon afterwards showed itself in the eye, of which the patient died. I removed, in a Mr. Bernard, an eye affected with this disease, and in less than twelve months the disease reappeared in a very large swelling above the groin. In the removal of this disease in the testicle, the complaint frequently returns in the loins and in the spermatic cord. It is quite necessary that the operation should be performed in the early state of the disease. If, therefore, a patient applies with this disease, and I put him under a course of mercury, and treat him as I shall directly describe I do a simple chronic inflammation of the testicle, and if it do not yield, I advise its removal: for if the spermatic cord in the least participates in the disease, the operation does not succeed: so soon as the wound be healed, and sooner if the wound be slow to heal, I give constitutional remedies to improve the general health, and to lessen the disposition to a return of the disease.

OF THE TRUE SCIRRHUS OF THE TESTICLE.

A very rare Disease.—This is an extremely rare disease ; that which I have previously described being the most frequent ;—indeed, for a length of time I doubted if the testicle was subject to the disease to which the breast is so prone ; viz., the scirrhus, which, in its progress, produces cancer.

I have seen few examples of that hard swelling in the testis which

resembles scirrhus, and I have never seen but one instance in which that hardened testis ulcerated and destroyed the part, resembling in its progress the cancerous ulcer of the breast. Old persons are most liable to this disease; in the few examples in which I thought the disease might be scirrhus, the age has been between fifty and seventy years.

Symptoms.—The symptoms have been, a slow increase of the testicle, a hardness which rendered the part almost impenetrable to pressure, occasional pain in the part extending towards the loins, the disease beginning in the testis; at length extending to the epididymis; extremely slow in its progress; the surface of the testicle feeling tuberculated, irregular, knotted, and excessively hard; the spermatic cord becoming gradually thickened; the body bent forward, or the thigh advanced; the leg and thigh, upon the affected side, swollen and œdematous; some water effused into the tunica vaginalis, so that the testis is felt through a hydrocele, a tumour at last forms in the loins, but never acquires the magnitude of that in the medullary disease, nor does the testis become so large in scirrhus as in the complaint before described. The patient sinks from impaired digestion, violent pain in the abdomen, and irregular state of bowels.

DISSECTION.

When the testicle is cut open, the tunica vaginalis and tunica albuginea are thickened; and, instead of the tubes which form the secreting structure of the testicle, a hard white mass is found, in lobes or tubercles, which are harder than the other parts, and in which cartilaginous and sometimes ossific matter is deposited. The epididymis has the same appearance, and some tubercles are found in the cord.

SCIRRHOUS TESTIS.

Case.—Thomas Cheston, aged 44, who had resided at Tottenham, was admitted into Guy's Hospital, for an enlarged and hardened testis. The testis, when first enlarged, was impenetrably hard; water formed around it, and the hardened mass was felt through the surrounding water, which, being drawn off, was found to amount to four ounces. His disease began in June 1808, and he says, he first observed a pain in the loins, and, a month afterwards, hardness and uneasiness in the testicle: it gradually increased, but never became very large. The testicle and epididymis, when he came to the Hospital, were both affected, but the spermatic cord was not enlarged. He had much pain in his loins, more especially in stooping. His countenance became then sallow; his digestion impaired; his leg and thigh, (but first the latter) became enlarged and œdematous. He had been a strong muscular man, and thought he was in good health when the disease began. The testis was removed in March 1809, and the wound slowly healed.

He was discharged the Hospital as soon as the wound was closed ; but the swelling in the thigh and leg remained, and he died a month after his return to Tottenham.

On examination of the testicle, after its removal, it was found hard, white, very compact, tuberculated, and in a few spots very vascular. The epididymis was also enlarged. We have, in the collection of St. Thomas's Hospital, three or four preparations of this disease, in which the appearances of the testis are as above described. The substance is white, very hard, tuberculated, cartilaginous matter in one part ; some ossific matter in others.

The disease does not increase, either in the part or in the abdomen, to the same magnitude as the fungous disease.

Disease of the Cord.—This disease requires the operation for its removal : but if the cord be affected, I have not known the operation succeed ; and, indeed, there is some danger to life in its performance.

Case.—In visiting the wards of Guy's Hospital, I saw a man who had a testicle very hard and considerably enlarged, and the cord of at least three times its natural size. I said to the students, " It will be of no use to operate in this case, for the disease has extended beyond the reach of the knife." One of the students, who thought himself wiser than the rest of the world, told the man, if he would place himself under his care, he would take a lodging for him, and remove the part. The man consented, and this young man removed the testicle, tracing the cord, as I was informed, very much towards the abdomen. Peritoneal inflammation succeeded, and the man died in a few days, prematurely for the patient, usefully probably for the rest of life to this foolish and presumptuous student.

Constitutional Treatment.—This disease will require the same constitutional treatment as that which I before described, after the operation has been performed, to prevent the return of the complaint.

LECTURE XIX.

ON THE SIMPLE CHRONIC ENLARGEMENT OF THE TESTIS.

THIS is an extremely frequent disease, and one which has been mistaken for a malignant complaint of the part.

Commencement of the Disease.—This disease begins in hardness and swelling of the epididymis, at first unattended with pain. It gradually increases, without pain, until the testicle becomes involved in the disease ; the testis is quite smooth ; the epididymis may be traced separately from the testis, the line of separation being more distinct than in the natural state. The patient's health appears

generally but little affected, and the part is so indolent, that the patient handles it with a degree of roughness, which surprises the surgeon. Both testicles not unfrequently become affected at the same time ; and sometimes, when the enlargement is subdued in the one, the other becomes diseased in a similar manner. The surface of the testicles and epididymis remain quite smooth, even under great increase of the part.

Its further progress.—In the state which I have described the testicle remains for weeks, and sometimes for months ; and then under severe catarrh or violent exercise, especially on horseback, it becomes very painful, with uneasiness of the loins and redness of the scrotum, which will be relieved by the means which are to be hereafter described ; but soon the symptoms return, and at length a suppurative inflammation ensues, which usually happens at the extremity of the epididymis ; a sinus follows, which discharges seminal fluid, stiffening the linen as semen is wont to do. From this sinus granulations spring and produce an exuberant growth, forming a prominent granular swelling upon the scrotum. This still continues for an indefinite time, unless something be done by surgery for its relief.

DISSECTION.

Before this disease was understood, I have several times known the testicle removed for it, and the appearances upon dissection I have preserved in the collection.

Adhesive stage.—In the adhesive stage, an uniform yellowish white adhesive matter loads the tissue of the part ; the semeniferous tubes remain, but are separated by the effusion which I have described.

Suppurative stage.—In the suppurative stage, upon cutting into the epididymis, and sometimes into the body of the testicle itself, a small abscess is found, containing pus, mixed with adhesive or fibrous matter ; and this state of the testicle will sometimes render its removal necessary. When it forms a granular swelling, it is found, upon dissection, that a small opening is formed in the covering of the epididymis, through which the granulations spring and expand ; and sometimes the testicle itself forms the granulation from the abscess which it contains, and which passes through an opening in the tunica albuginea. These abscesses will sometimes, after discharging for months and even for years, absorb the testicle, and leave the patient with little more than the tunica vaginalis and the tunica albuginea remaining ; and if both testes have been affected, impotence is the result.

OF THE CAUSE OF THE SIMPLE CHRONIC DISEASE.

Morbid state of the Urethra.—This complaint is often depending for its production upon a morbid state of the urethra, which produces a sympathetic influence upon the testicle. Sometimes it is simple irrit-

ation of the urethra which produces it ; sometimes a stricture in the membranous part ; now and then an irritation in the prostate gland, or in the prostatic part of the urethra. But still it is wrong to view it as having merely a local origin ; for there is, in most of these cases, a state of constitution which predisposes it, and without constitutional alterative means you will not succeed in curing it. I have often seen this disease follow syphilis : frequently observed it accompanied with an eruption, which many would conceive of a syphilitic character ; often known it to follow a mercurial course in delicate persons, who have, during the time, been exposed to vicissitudes of temperature, and to catching cold from being frequently wet in inclement weather.

OF THE TREATMENT OF THIS CHRONIC INFLAMMATION.

This complaint, for which the testicle is frequently removed, under a mistaken idea of its malignant tendency, generally yields to the treatment which I shall now advise you to adopt.

When you are consulted respecting the complaint in its adhesive stage, you will say to your patient, "Now, if you choose to be cured, there is no difficulty in effecting it ; but I fear you will not submit."—"Oh," he says, "I will submit to any thing to prevent the loss of my testicle." Well, the plan then is as follows :

Position.—1st. Observe the recumbent posture for a month. It is not sitting with your legs raised which will suffice, but to be absolutely recumbent is necessary.

Medicine.—2d. Take two or three grains of submurias hydrargyri and a grain of opium night and morning, until the mouth be sore : and then such a quantity as shall preserve that tenderness of the gums for a month.

Local Bleeding.—3d. Apply leeches twice in the week, or let the patient stand before his surgeon and have the veins of the scrotum opened by a lancet.

Application.—4th. Apply upon the scrotum equal parts of camphorated mixture and vinegar.

5th. About every fourth morning give an active dose of infusion of senna, with sulphate of magnesia and tincture of senna.

Period required for the Cure.—In about three weeks, in this way, you will reduce the size of the part ; and then, if the urethra has been diseased, and the complaint be sympathetic, you may introduce daily a silver sound, to remove any obstruction in the urethra, whilst the patient is still recumbent and living low ; when the disease will, at the end of the month, or of five weeks, be cured.

In the practice which I have had an opportunity of witnessing, it will be readily supposed I have seen a great number of such cases, and I can therefore speak with confidence of the result of the above treatment ; but the following is an excellent example.

Case.—An officer of the British army, of considerable rank, some

years ago, was seized with inflammation in his testicle, for which he applied to a surgeon; who, after various attempts to reduce it, told him that it was a malignant disease, and that it must be removed. He submitted to the operation and quickly recovered. Some months afterwards the remaining testicle began to swell, and the symptoms were so exactly similar to those of the former disease, that he became excessively alarmed, and placed himself under the care of Mr. Rose, who requested a consultation with Sir Everard Home and myself. We found the testicle hard, swollen, and but little painful: his general health had suffered from a warm climate and exertions disproportioned to his strength. He was put upon the plan which I have recommended above, and in a very few weeks was perfectly well.

A fair inference may therefore be drawn, that the testicle which had been removed might have been saved.

Many testicles condemned for removal I have thus known preserved.

Sometimes requires Removal.—When the disease has proceeded so far as to produce an abscess in the testicle, it will sometimes require to be removed.

Case.—One of our students, who afterwards became a surgeon in the cavalry, had an inflammation and chronic enlargement of the testicle, which had been repeatedly relieved by means similar to those which I have recommended; yet each time he returned to exertion, the inflammation and swelling were reproduced: tired by repeated disappointments, and unable to pursue his profession as he wished, he begged me to remove the part, which I did: and upon examination of it, after the operation, I found a chronic abscess in its centre.

Granular Swelling.—When the abscess is followed by a large swelling, produced by an exuberant growth of granulations (a granular swelling), the treatment which is to be pursued is to be as follows:

Treatment.—1st. Try pressure with adhesive plasters; and if this does not succeed,

Caustic.—2dly. Sprinkle the surface with powdered sulphate of copper, or nitrate of silver, which gradually reduces it. I once knew arsenic applied freely upon the granulations, and it destroyed life.

Removal.—3dly. It may be removed by excision. An elliptical incision is made into the skin on each side of the projecting granulations, and then the knife is to be carried horizontally under the root of the swelling, where it projects from the opening in the tunica albuginea; and thus it is removed. The edges of the skin are then brought together by suture, and healed.

4thly. But when the epididymis and testicle are much involved in the disease, and there is much loss of substance in the scrotum, it is necessary to remove the testicle.

OF THE IRRITABLE TESTIS.

Symptoms.—This disease is known by the following symptoms:—the patient has an uneasy sensation in a part of the testicle; it is tender

to pressure, tender also in exercise, and unusually sensitive at all times. The sensibility of the part becomes occasionally so much increased, that the slightest touch is exquisitely painful; pain is felt in the back and groin; the motion of the part and slight pressure of the clothes in walking produce so much pain as to almost forbid exercise, and the patient finds no comfort but by reposing continually upon a sofa, or by remaining in bed. The testicle is little swollen, and the whole of the part is not equally tender. The spermatic cord sometimes partakes of this exquisite sensibility. If the part be not supported, the pain is scarcely tolerable. The patient is obliged to place himself in bed upon the opposite side to the disease, or he does not rest. He has pain in the thigh on the same side,—the testis appears full and loaded. Motion in most cases produces not only pain at the time, but additional uneasiness afterwards. The stomach is rendered extremely irritable, and vomiting is sometimes produced.

The disease frequently continues many weeks, sometimes exists for months, and with others endures for years. When the patient thinks himself much better, a little more exercise than usual renews all the symptoms.

The complaint produces, in some instances, so much distress of mind, so high a degree of bodily suffering, and so completely incapacitates the sufferer from amusement, and the pursuit of a profession or business, that he seeks relief from an operation which I was thrice compelled by the patients to perform, rather than recommend it upon my own judgment.

The following is a statement by a medical man of the symptoms of the disease, which rendered his life burthensome to him.

CASE I.

“I think I can trace back the origin of my complaint to the spring of 1817, about eight or nine months before I married. I lived too well: got very corpulent and bloated, and had excessive venereal excitement, which I did not gratify, and felt the testicles and vessels of the cord ready to burst; but when I rose and walked, the uneasy sensations subsided.

“Soon after I married I began to feel the uneasiness in the testicle I have since suffered from. I felt pain in coitu so great, as to lead me to go to London for advice. The testis is a little fuller; extremely tender to the slightest touch of the fingers; coitus always irritates it, so that the swelling and tenderness increase from it: the soreness is felt in the upper and outer part of the testis, and in the vessels of the cord. With regard to the nature of the disease, I have been a long time convinced it is seated in the nerves of the spermatic cord; the pain is a benumbed sensation,—at some times, a pricking feel;—at others, such as would proceed from a compressed or irritated nerve. It is uniformly increased by whatever disturbs the position of the testis, or presses upon the ring, or course of the cord. I can bear the

erect position for a few minutes, provided the part be properly adjusted. When I lie on the left side, the pain is of a dragging kind, and feels as if it extended from the region of the cœcum ; and when on the right it is more sharp, and feels as if the parts, which are tender, were pressed upon by those in the neighbourhood : I feel most easy on my back. There is considerable fulness on the side of the pubes, which is always increased, and extends higher in the direction of the cord, when the pain in the testis has been greater than usual.

“After aperient medicine has produced two or three motions, I usually suffer more pain for a day, and the passage of flatus through the cœcum produces the same effect.

“The cord appears, as far as its tender state will bear examination, to be free from organic change ; and the testis, excepting that it is occasionally full, seems unchanged in size or structure.

“My general health is good, and every other function is natural :—yet I have now been confined to a horizontal posture for a year.

“It has always happened, that however severe the pain has been on the side and right limb, or region, it has given way to cold applied to the abdominal ring ; and comparative if not perfect ease has been enjoyed for an hour afterwards.

“The means which I before used, but most ineffectually, as to my cure, have been leeches ; a solution of nitre, in a bladder, to the part ; belladonna and the cold hip bath ; sea bathing ; regular aperient medicines, and all the means which the best advice in this country could suggest.

“I consider my symptoms might have originated in an injury I received upon the cord, some time before the symptoms began.”

CASE II.

Master H. aged 14, has a teasing and aching pain in the testis. Exertion brings on the pain ; leaning forward increases it. He cannot walk one hundred yards but he has pain in the groins, loins, thigh, and leg, to the foot, on that side ; the testicle is tender to the touch. The recumbent posture relieves him, unless he has catarrh, and then he has the pain even in bed.

DISSECTION.

I have removed the morbid part in three instances ; and I thought, in the first case, the centre of the epididymis was diminished, and that the disease might be produced by an accumulation of semen behind it, and that the obstruction might produce the pain ; but I am inclined to believe that the disease is in the nerve, as in the other two cases there was no marked disorganization.

It seems to me to be a species of *tic douloureux*, supported by the constant functional changes to which the part is liable ; for if it arose from organic change, it would not, as it does, cease for a considerable time, and then relapse.

OF THE TREATMENT OF THIS DISEASE.

Medicines.—The remedies I have seen most useful have been small doses of the oxymurias hydrargyri with the compound decoction of sarsaparilla, given twice per diem, and continued for a length of time. The application of a belladonna plaster to the part, and opening a blister at the groin, and dressing it with ung: cetacei et opii. A sea voyage to a warm climate, I have known improve the patient, from the rest and change of constitution it has produced. It will be right to try arsenic, which has considerable power over tic douloureux; to give quinine, as bark relieves it; also to try steel, as it has been recommended by Mr. Hutchinson, of Southall, but at the same time to deplete the part by leeches, and lessen the nervous irritation by the application of a solution of nitrate of potash and muriate of ammonia, in a bladder. Bougies do not relieve it; but the ung: lyttæ, used to produce a slight discharge from the beginning of the urethra, I have known of service.

The following are the three cases in which I have operated for the removal of the testis on account of this affection.

CASE I.

Mr. G—— contracted a gonorrhœa at Paris, in October 1815, and in consequence had inflammation of the right testicle, for which he applied fomentations and took aperient medicines: the testicle continued swelled and painful until June 1816, when the employment of strengthening plasters removed all inconvenience; a slight degree of pain returned at intervals until June 1817, when he was again relieved by plasters, and thought himself sufficiently well to join his regiment. The exercise, which his duty obliged him to take, soon occasioned so much pain, that during the winter of 1817 and spring of 1818, he scarcely had a moment's respite, but only used a blister, which he thought only increased the tenderness. In May 1818 he returned to England, and bathed in the sea till September, at which time the pain was nearly removed, but he was unable to walk or ride. Since he has not employed any remedy but nine weeks' sea-bathing at Brighton, which produced no amelioration: he was unable to walk ten yards without experiencing considerable pain; the only thing which appeared to relieve him was violent motion in a rough carriage.

On account of the continued pain, confinement, consequent depression of spirits, and loss of health, he determined on having the testicle extracted, which I removed on the 1st of March 1819. The wound healed slowly, and one or two small abscesses formed in the scrotum, but he ultimately did extremely well.

CASE II.

Captain P. had an irritable state of the left testis, which commenced in March 1818. The vein of the spermatic cord felt distended; the part was exquisitely tender to the touch, and exercise produced pain,

which was intolerable if the part was not supported : he could not rest on the left side, or bear the slightest pressure on the testis ; he had increased pain in coitu, and after it the part felt full and loaded. He was somewhat, but only for a time, relieved by the hot bath, or fomentations. He tried blistering at five different times : applied two hundred leeches, at separate times, to the affected part : employed also various lotions, opium, and belladonna, with every medicine which seemed likely to be useful in lessening the irritability ; but all without benefit.

I removed the testicle for him in 1823 : he quickly recovered from the operation, and felt very grateful for his restoration to society.

CASE III.

This case is drawn up by the gentleman himself, who came from America to consult me ; he also saw Mr. Abernethy and Mr. Pearson. Having tried every variety of medicine and local treatment without advantage, and determined not to return to America with the disease, at his request I removed the part, and have since heard that he remains perfectly well. He says :

“ For several years past my left testicle has been larger than my right ; at times considerably so, especially when I have taken cold. Early last summer I began to be uneasy about it, but neglected to take advice. In August I lost two children by the yellow fever, and in my anxiety I exposed myself to unusual fatigue ; and in a few days after their death, the last week in August, I had for the first time pain in the left thigh and groin, also in the testicle, which was much enlarged. I then applied to one of our best surgeons, who made an incision into it, and let out a large quantity of water ; this was about the 10th of September : he then desired me to suspend it, as I do now, and to use a lotion of the extract of lead and opium. In a few days after the part became painful, for which I applied tepid poultices of bread and milk, and bathed it in warm water. The pain continued, and in about six weeks after, the operation was repeated ; but very little water was drawn off : no injection was used. For some time previous, and for about six weeks after the second incision, I took mercurial pills, two or three each day, and occasionally used mercurial friction on the thigh and testicle, keeping up a soreness in the mouth, but not producing much salivation. With some intermissions this course was continued for about four months : I laid in a horizontal position, except occasionally for a few minutes at a time, and drank only toast and water ; lately I have taken Madeira and water, or one or two glasses of Madeira, at dinner. In December, a blister was applied to the scrotum, which produced a copious discharge. I think all these remedies gradually reduced the size of the testicle ; but the pain continued ; sometimes a sharp shooting pain in the groin ; but generally a heavy, dull, constant pain.

“ In March I procured some leeches from New York, and applied

seven ; bathing with tepid water, by which I got away a considerable quantity of blood, producing great debility. In April I again applied three leeches ; since which I used the lotion of lead and opium.

“ At present the part is about the same size as it has been for two months past ; but the pain is constant, and I cannot stand for ten minutes without increasing it considerably ; there is great sensibility in the part ; the slightest touch is painful.

“ My general health is as good as it has been for years past ; I am subject to headach, and other dyspeptic symptoms : a long residence in warm climates has injured my constitution.”

OPERATION OF CASTRATION.

I shall conclude this Lecture with describing to you the operation of castration. The patient being placed upon his back, upon a table of convenient height, with his legs hanging over its end ; and the hair of the pubis being removed, the surgeon begins his incision at the upper part of the external abdominal ring and extends it to the bottom of the scrotum. The lower part of the scrotum should be divided, or a bag of matter afterwards forms in it. The next incision is made upon the spermatic cord, just below the abdominal ring, so as to lay it distinctly bare, and to enable the surgeon to raise it. In this second incision the external pudendal artery is divided, and affords a bleeding, which leads the surgeon to request it may be compressed by an assistant, until the testis be removed. The next step of the operation consists in raising the spermatic cord, and in passing a curved needle, armed with a ligature, nearly through its centre, just below the abdominal ring ; the ligature is then to be held by an assistant, which prevents the retraction of the cord into the ring, by the contraction of the cremaster muscle. The cord is then completely divided, and the surgeon drawing by it the testicle towards him, separates the cellular tissue between it and the scrotum, and thus detaches it from the surrounding parts.

Sometimes, from inflammation, the testicle adheres to the scrotum, in which case it is best to remove a portion of the latter, rather than to make a tedious and painful dissection in separating these parts. When the testicle is removed, the spermatic artery is sought for in the anterior part of the cord, and, when found, is to be secured by a ligature ; next, an artery which accompanies the vas deferens, is in like manner to be tied, taking care to exclude the vas deferens from the ligature ; after this, the thread which had been passed through the cord, to prevent its retraction, is withdrawn. Any vessels in the scrotum which bleed must be taken up. The coagulated blood is then removed from the scrotum, and two sutures are put into it to bring the edges of the wound together ; one just over the end of the cord, and the other midway between it and the bottom of the incision ; lint

is to be laid over the wound, and it is best at first not to apply any plaster.* The part is to be supported by a handkerchief, or T bandage.

The ligatures separate in about eight days, and in three weeks the wound will probably be healed. The cruel practice of tying the whole cord with a broad ligature is now properly abandoned by every good surgeon.

LECTURE XX.

ON DISEASES OF THE BREAST.

THE diseases of this organ have been too much considered as being of a malignant nature ; and females, who have had the misfortune to have tumours in their bosoms, have been often very unnecessarily submitted to an operation, under the idea of the complaint being cancerous. I shall therefore proceed to state what I have been able to learn of the various diseases of this organ, to discriminate the malignant from the more benign complaints, and to point the cases which really require removal, in distinction from those in which operations are entirely unnecessary.

OF THE HYDATID OR ENCYSTED TUMOUR.

Symptoms.—This disease begins in a swelling, which is unattended with pain, and which has the character rather of a chronic inflammation, in a part of the breast, than as bearing a resemblance to a scirrhus tubercle ; for it has neither its mobility, its excessive hardness, nor its general circumscribed or distinct limits, but it incorporates itself with the surrounding parts of the breast.

The skin over the mammary gland is undiscoloured, and the part is scarcely tender to pressure. The general health is unaltered, even when the swelling becomes of the most formidable magnitude.

Becomes in part Fluid.—As it increases, a change in the nature of the swelling is produced : at first it was uniformly solid, but is

* From the loose texture of the scrotum, and from the large quantity of cellular tissue, the small vessels are liable to escape the notice of the surgeon immediately after the operation, by their retracting. I always allow the patient to become warm in bed before the dressing is completed, at which period the scrotum becomes relaxed, and I have seen a free hæmorrhage occur at this time, obliging the surgeon to remove the dressing, in order to secure the bleeding vessels. If no further bleeding, however, takes place when the patient has become warm, the wound is dressed with some mild plaster, and the parts well supported.—T.

afterwards distinctly divided into a solid and a fluid part ; the latter fluctuating, so as at once to inform the surgeon of the existence of a fluid. If this part be punctured, a liquid, having the usual character of serum, is discharged ; the cyst sinks, but soon becomes again distended, and the swelling continues to grow. At length the tumour acquires enormous magnitude, and some of the largest swellings in this organ are of the hydatid kind. I have twice seen swellings not of this description, rather larger than the hydatid ; but generally the largest in the breast are of this kind.

One, which I removed, with Mr. Cline, from Lady Hewett, weighed nine pounds.

From Mrs. King, at Charing Cross, I removed one which weighed thirteen pounds ; but frequently they are removed when still small, under a supposition that they are scirrhus tubercles.

These swellings are pendulous, and the whole breast is very moveable even when large ; they are generally unattended with pain, although to this rule there are exceptions, and the constitution is but little disordered. The absorbent glands, in the most aggravated form of this complaint, are undiseased, so that it does not extend by absorption.

Inflammation of the Cysts.—Inflammation sometimes takes place in one of the cysts ; and, when the cyst ulcerates, serum mixed with mucus, and occasionally with a little matter, is discharged ; the wound then heals, and the cavity seems obliterated ; but the disease again ulcerates in other parts, and passes through the same process.

It is a complaint I have seen at all ages after twenty, but more frequently in advanced age than in youth.

DISSECTION.

Upon dissection, the breast is found to be consolidated by the adhesive inflammation, so as to form a very firm swelling in some parts, but in others it contains cysts distended with serum. The cysts vary in size ; some of them contain mucus mixed with pus. The cysts which I have seen in the breasts have been of three kinds. First, The globular hydatid, like that which is found in the liver, contained within a vascular cyst. A second species, composed of numerous membranes, which may be peeled from each other, like the concentric lamellæ of the crystalline humour. But tumours of the breast are sometimes composed of simple bags which contain and secrete the serum, or watery-fluid, within them.

CASE I.

Mrs. King, of Charing Cross, aged 58, had an enormous enlargement of her left breast ; she discovered it fourteen years ago, and supposed it arose from a blow. When first observed it was as large as a marble only, hard, and entirely unattended with pain.

It seemed to be buried in the breast, and was not very moveable in the glandular structure.

It gradually grew until two years ago, when it had acquired the size of a melon. At that period it seemed suddenly to grow faster than before; but was still unattended with pain, and her general health appeared to be good.

Last Christmas it also acquired a very sudden increase, but was still free from painful sensations, excepting that sometimes, when she had a cold, she felt a slight uneasiness in the part.

On the 30th of September, 1822, I was consulted; the tumour then measured thirty-five inches in circumference, was solid, and felt cartilaginous in some parts; but in others was soft and fluctuating, and one bag evidently contained a large quantity of fluid. The solid tumour was placed above, the fluid occupied the lower part of the swelling. Her general health was good, and the swelling was free from pain; but she suffered much from its weight drawing down the skin and pectoral muscle, and putting the nerves exceedingly on the stretch.

On the following day it was removed, in the presence of Mr. Key, surgeon of Guy's Hospital, and Mr. Laviss, a practitioner in Westminster.

The large vessels, divided in the operation, were immediately secured, or pressed upon, so as to prevent any considerable loss of blood.

The wound when dressed on the seventh day appeared healthy; her constitution suffered but little, and she recovered without any untoward circumstance, and is now living at the same residence.

Upon inspection, the greater part of the swelling appeared like boiled udder; within which, at various parts, cysts were contained, and when these were opened, hydatids, composed of numerous lamellæ, were found: serum was effused around them.

CASE II.

June 1818.—Lady Hewett, aged 60, tall and of strong constitution, dates the origin of the swelling in her breast from a blow she received, November 1815, in her axilla, by falling against a chair; although she had previously felt some evanescent pains in her right bosom. Nine weeks after the blow she felt uneasiness in the right breast, which extended into the axilla. In the beginning of 1816 she discovered a swelling in her right breast, which was about the size of a nutmeg, situated below the nipple. In May 1816 it had acquired the size of a melon, and she consulted Dr. Sharp, of Thrapston, who ordered her what medicines he thought most appropriate to her situation, and sent her to Harrowgate; but, as the swelling increased, she applied leeches every day for two months, and afterwards every other day, till September, without advantage.

She then determined to try the influence of pressure, which she continued several months, by adhesive plaster, and afterwards by an

instrument, contrived for the purpose, which was worn during four months, but without any advantage, as the swelling still continued to increase.

She therefore determined to leave the case to nature, and she did so until November 1817, when the swelling began to undergo a change. It increased quickly, and became soft at its upper part, appearing inclined to suppurate :—fomentations and poultices were applied, calomel and opium given, but matter did not form. This treatment was continued until the May following, when she discontinued all the means.

In June 1818 she made up her mind to submit to an operation, which I performed on the 10th day of June 1818, in the presence of Mr. Cline, Mr. Lowdell, and my nephew, Mr. Bransby Cooper.

The swelling was of great size, weighing nine pounds. It was in part solid, in some parts evidently contained a fluid, and over the fluid part there was a slight blue tint. The swelling was very moveable, and reached down upon the upper part of the abdomen. Lady H.'s general health was good. The first steps of the operation consisted in making a puncture into the tumour at its most prominent part, and discharging a quantity of serum from it, by which it was at once clear ; the disease was of the hydatid kind, and the magnitude of the swelling was lessened. An incision was then made across the tumour, a little above its middle, and the flap of integument being raised, the upper part of the swelling was detached from the pectoral muscle ; and with the handle of the knife the swelling was further separated, and a flap of skin being left below to meet that at the upper part, the operation was thus concluded. The removal was borne with great fortitude. Two arteries, of considerable size, required to be secured. The integuments were brought together by a single suture, and by adhesive plaster. On the 16th of June the wound was first dressed, and on the 30th Lady H. was quite well.

CASE III.

The wife of Dr. W. aged 45, twenty-six years ago, fell in getting into a carriage, and received a blow upon the breast, which immediately became black and uneasy ; she applied leeches upon it, but a small lump remained. Three years ago the swelling began to increase, and, from a rounded form, became oblong, but was free from pain ; its increase was so gradual, that little alteration was produced in twelve months. At this time the veins began to enlarge and the skin to be discoloured ; yet still it was free from pain. At the end of two years she applied to me, and I ordered leeches, which emptied the veins, but did not diminish the swelling, for it continued to increase, and several blue spots appeared upon it ; but it preserved a globular form : spirituous lotions were applied upon it to check its growth by evaporation.

Two months before the operation the tumour underwent a sudden increase, and was supposed to weigh about five lbs. She was free from pain during the whole progress of the disease ; her spirits were good ;

her activity undiminished, and her constitution was unaffected until the last two months, when she said she felt nervous ; and headaches, which she had always had occasionally, increased in the progress of the disease : the original lump was for a time distinct in the tumour, but at length blended itself with the general mass.

In June 1818, in the presence of Mr. Cline, I removed this tumour, by making two flaps, as in the last operation, and I tied the arteries which I divided as I proceeded. Little constitutional irritation followed, and in six weeks Mrs. W. was well. The appearances in this breast were similar to those in Lady Hewett's.

CASE IV.

Mrs. Styles, aged 28, had a tumour in the breast which had existed three years, and which was sometimes painful from changes of temperature, and sometimes from the approach of menstruation ; but the pain was inconsiderable.

It began in a swelling of the size of a filbert, which was hard and moveable ; but it gradually became larger until it was about two inches in diameter : her menstruation and bowels were regular, but rather inclined to costiveness ; her general health was good.

My nephew, Mr. Bransby Cooper, removed this swelling, before me ; and when he cut into the tumour, a bladder of water was opened.

The cyst, in which the water was contained, appeared very vascular ; it was then removed : the wound healed in a fortnight ; but an abscess afterwards formed and discharged for six weeks, and then closed. This was therefore a simple cyst, formed in the cellular membrane, containing a considerable quantity of a serous secretion.

We have, in the collection at St. Thomas's Hospital, a large globular hydatid, which Mr. Cline informed me was discharged from the breast.

It appears then, as I have stated, that there are three kinds of hydatid or encysted tumours, in the breast. One, in which the production is a globular hydatid, like that which is considered to be a distinct animal, and which is now and then met with in different parts of the human body ; the second a cyst composed of numerous lamellæ like the crystalline humour ; and the other, a bag containing serum, and probably produced by an adhesive process shutting the communication between the cells of the cellular tissue, in which secretion proceeds.

DIAGNOSIS.

The marks of distinction in this disease are : 1st, the health remaining perfect ; 2dly, the almost entire absence of pain, unless there is a suppurative tendency in the cysts, when I have known the disease painful ; 3dly, the swelling being firm, smooth, and not tender to the touch ; 4thly, when a fluid forms, the fluctuation being very distinct, and a slight blue tinge being observable when it approaches the skin ;

5thly, the fluid, when evacuated, having the transparency of water, with a very slight yellow tinge, and this is sometimes succeeded by a discharge of mucus.

TREATMENT OF THIS DISEASE.

When the tumour becomes of great magnitude, there is no other mode of relief but by removing it; and, although the complaint be very formidable in point of size, yet the operation is attended with very little danger, and if the arteries have become large, the only care which is required is to secure them during the operation, as they are divided.

When removed by Operation, it does not return.—No remote danger exists, for I have never known this disease return after any operation in which the swelling was clearly removed; although I have (but not in the breast) when a small part of the swelling remained. But the disease does not contaminate the absorbent vessels or their glands, but is to be considered as entirely local.

When a single cyst exists, the swelling does not require removal.

Case.—A young woman was sent into Guy's Hospital, many years ago, by Mr. Saumarez and Mr. Dixon, who had a tumour in her breast, which at first felt hard, and was about two and a half inches in diameter. Seeing her general health was perfectly good, I applied a plaster, and did no more; the swelling underwent but little change, and she quitted the Hospital. Many months after she applied again for admission, because the swelling was much increased, and I then ordered her into the operating theatre, to remove it; but upon examining it with great attention I felt a fluctuation, and turning to the students, I said, "I shall put a lancet into this swelling to ascertain its contents;" which I immediately did, and serum only was discharged. I introduced a small piece of lint into the orifice, brought on an adhesive inflammation, the sides of the cyst adhered, and the patient did well, having no return of the complaint.

ON THE SCIRRHOUS TUBERCLE.

This disease is of extremely frequent occurrence.

The symptoms with which it is accompanied are as follow:

Symptoms.—The swelling is generally discovered after it has acquired considerable magnitude, and it must have been the growth of several weeks. It is said to be discovered by accident: but if the patient distinctly traces her feelings she will have observed some uneasy sensation, which led her to feel the part. Sometimes the attention is first attracted to the bosom by a drop of bloody serum having stained the linen opposite the nipple, it having flowed from one of the lactiferous tubes. Sometimes a distinct and sharp pricking pain leads to the discovery of the swelling.

Situation.—It feels extremely hard. It is evidently seated in the gland of the breast. It is moveable, but more so with the breast than in itself. It is usually distinctly circumscribed, so that the surgeon thinks he is able to decide upon its limits, yet it generally happens that portions of it branch out into the gland and connect it with parts of the breast at a distance.

Sometimes not Tubercular.—In some instances it is rather a scirrhus inflammation in the breast than a distinct tumour, which hardens and swells the bosom throughout its whole extent. In this state I have seen it cross through the cellular tissue to the other breast, and gradually extend in a similar manner through it. At first the scirrhus tubercle is not painful, but subsequently becomes so; but then the pain is occasional only, occurring at distant intervals.

Pain acute.—The pain is excessively severe, commonly as a stab in the part; sometimes a burning heat; now a pricking sensation; then a sense of tearing, as if the nerves of the breast were torn out, or the breast itself tearing off. In other cases the pain is more obscure, like the aching of rheumatism. It generally extends to the shoulder on the same side, and often affects the nerves of the arm.

Intermittent Pains.—The painful sensations in the breast recur about once in ten days or a fortnight, when the swelling begins to be painful; but more frequently, as the disease advances; and I believe there is an occasional determination of blood to the part, and that the disease increases, particularly when this painful period recurs.

More severe prior to Menstruation.—Prior to menstruation, (about four days) the breast feels fuller, heavier, and much more painful; and although, from the last mentioned period it may have been tranquil, it scarcely ever fails to have painful sensations at the return of the menstruation; but more just prior to it, than at the exact moment; for it is relieved so soon as the evacuation begins, and is always much lessened after its cessation.

Gradual Increase of the Disease.—The swelling gradually grows from the size of a marble, when it is first observed, until it acquires a magnitude of two or three inches in diameter; for it rarely happens that the true scirrhus tubercle increases to a very considerable bulk, and this circumstance is one of its criteria.

Retraction of the Nipple.—The next change is a retraction of the nipple, and this occurs from the lactiferous tubes being drawn out of their course by the swelling, and consequently they draw in the nipple, in which they terminate; frequently also the nipple becomes red, inflamed, excoriated, and sometimes ulcerated.

Puckering of the Skin.—A change is also produced in the appearance of the skin; it is puckered so as to resemble a cicatrix, and this arises from its adhesion to the surface of the tubercle. Frequently the follicles of the skin are filled with black sebaceous matter around the nipple, in the areola, and in the skin on the surface of the breast.

Absorbents become affected.—The cellular membrane becomes

inflamed and hardened, and little tubercles form in the absorbent vessels under the integuments.

The Glands in the Axilla enlarge.—At this period, or sometimes prior to it, the glands in the axilla become enlarged, and many of these are often affected. But if the disease be on the sternal side of the nipple, the gland just above the clavicle at the lower part of the neck, is felt hardened and increased; for then the irritation is extended by the absorbents through the intercostal muscles to the internal mammary absorbent vessels and glands.

Extends to the Clavicular Glands.—When the glands in the axilla have been many of them enlarged and obstructed, I have seen the scirrhus irritation proceed by the absorbents from the axilla to the back of the shoulder, on the scapula, and extend from thence to the glands above and behind the clavicle.

Exists for Years without destroying Life.—Months, and sometimes years roll on, and the disease continues in its adhesive stage, and it even often destroys without further change occurring; but frequently it proceeds to a suppurative inflammation: then the skin appears of a livid redness; the pain becomes even more severe; a slight sense of fluctuation, or rather of yielding, is perceived in this part, which gradually ulcerates and discharges only a bloody serum; for true pus is not generated. Pus is attempted to be produced; but it is not formed upon the truly malignant surfaces, but only upon the surrounding parts, if they be ulcerated. I have, however, sometimes seen an approach to suppuration.

Character of the Sore.—The surface of the sore feels hard, like the original tumour, and is remarkably insensible to pressure; and you therefore will observe the patient wipe it and handle it with a degree of roughness and want of gentleness, which surprises those who are unaware of its little sensibility. The granulations which spring from the sore are imperfectly formed; in some parts rising considerably, in others scarcely any are produced: they differ from common healthy granulations in their hardness, in their insensibility, and in their secretion; which is, as I have stated, generally a bloody-coloured serum.

The Ulcer frequently Bleeds.—Bleedings from the sore are frequent: they occur spontaneously, and relieve the patient's sufferings; and the observation of this may have led to the use of leeches in the treatment of the first stages of the disease: they also arise from removing the adhering dressings, or from wiping the surface of the sore; and the flow of blood does not easily stop, as the vessels have little power of contraction; pressure, however, succeeds in checking the hæmorrhage.

The edges of the sore become everted, the ulceration gradually proceeds until a large ulcer is formed, and often a very deep excavation is produced, so as to expose and even ulcerate the pectoral muscle. At this period, and often before ulceration has commenced, the patient complains of rheumatic feelings in different parts of the body, but

particularly in the loins and in the thighs ; but I have also known other parts, as the spine, become painful ; violent pain and tenderness have been felt in the sternum and ribs, and the patient describes the pain to be that of animals gnawing the parts. I attended Lady M. who, for many weeks before her death, described herself to suffer daily the pains of the rack, arising from cancerous rheumatism.

The appearances produced by this disease in the bones, I shall presently describe.

Great dyspnœa is also attendant upon this complaint, and the patient cannot lie down in bed, or can only rest upon the diseased side ; she is also frequently teased with a cough, unattended by expectoration.

Frequently violent spasms are felt, which are referred to the region of the stomach, and they are often attended with vomiting ; but, I believe, they arise from a tuberculated state of the liver. The complexion is sallow, with now and then a slight flush upon the cheek.

Extension of the Disease.—After some time the arm, upon the diseased side, begins to swell above the elbow, then the fore arm enlarges ; at length the swelling extends to the axilla. Its feel is brawny ; it does not pit so easily as common œdema ; the swelling seems to arise from the loss of absorption produced by the destruction of the texture of the absorbent glands, and from compression upon the veins of the axilla, from glandular enlargement. The constitution becomes excessively irritated by the swelling, by the pain which attends it, and by the augmented disease in the breast, and thus gradually the patient sinks under her sufferings.

OF THE DISSECTION OF PERSONS DYING WITH SCHIRROUS TUBERCLE, OR CANCER.

The tumour in the breast is a solid mass, approaching to the firmness of cartilage, waved upon its surface, composed of fibrous matter within, and the lactiferous tubes may be seen in white lines, taking their course through it.* If macerated for a time in the same water, the scirrhus matter softens and leaves the cellular texture, in which it has been deposited, with its fibres thickened and unnaturally strong. Processes extend from the swelling into the surrounding parts of the breast, which must be carefully felt for in the living subject, if an operation be performed. The blood-vessels at the edge of the tumour are more numerous than in its substance, unless it be ulcerated, and then around the ulcerated part a great many are seen.

It seldom happens when a tumour of this kind exists in the breast, that only one is found, for there are generally several smaller in different parts of the glandular structure. The skin often adheres to the surface of the swelling, and the absorbent vessels of the skin have frequently little tubercles in their coats.

* It sometimes happens, that earthy matter is secreted into the lactiferous tubes within the swelling ; but this is by no means a constant appearance.

If the swelling adheres to the pectoral muscle, scirrhus matter is deposited in the direction of its fibres, and it is converted into a hard and white substance ; the glands in the axilla are changed in their internal appearance from the deposit of a scirrhus secretion resembling that in the breast, but more vascular and more quickly ulcerating, and then they become spongy. The glands above the clavicle are in the same state ; and those on the left side, when enlarged, press upon the end of the thoracic duct, and disturb its functions, producing excessive pain for some time after taking food.

The glands behind the cartilage of the ribs, when this disease is placed upon the sternal side of the nipple, are generally diseased. It often happens that the axillary glands upon the opposite side to the diseased breast are also enlarged and hardened.

Of the Lungs.—When the chest is opened, the lung on the diseased side, and sometimes on both sides, is inflamed, and partially adheres to the pleura costalis. Serum is found in the cavity of the pleura, on the diseased side, from which I have known death produced in a few days, after an operation of removing a scirrhus tubercle. When the finger is passed over the internal surface of the pleura costalis, little scirrhus tubercles are felt upon it, and the pleura on the surface of the lungs has similar, but larger, scirrhus swellings.

Of the Liver.—The liver has frequently scirrhus tubercles on it, more especially when the disease in the breast is seated on the right side.

Of the Uterus.—The uterus is rarely free from disease ; one, or sometimes several scirrhus tubercles are formed in it, and this produces the pain in the loins, of which the patient so frequently complains.

Of the Ovaria.—I have also seen the ovaria enlarged, hardened, and tuberculated.

Of the Bones.—The bones have frequently scirrhus deposits on the cancellated structure.

We have the sternum, taken from Mrs. Edge, preserved in the collection at St. Thomas's, with scirrhus secretion in it. We have the thigh bone of the same lady, which broke merely in her rising from bed. We have a fractured thigh bone in the collection, taken from another patient, which broke by her turning in bed.

We have also two most curious specimens of diseased spine, in which much of the bone has become absorbed, and scirrhus tubercles, deposited in the spaces left by absorption.

Age at which this Disease appears.—With respect to the age at which the disease appears, I have frequently seen it at all periods between thirty and seventy years. I do not recollect more than two cases, in which the nature of the tumour was decidedly scirrhus, under thirty years. I have seen one case at ninety-three years, another case at eighty-six, and have removed one at seventy-three, ulcerated, and the patient did well. It most frequently occurs about fifty years of age. In ninety-seven cases, which I remarked, twelve were of that age.

Often confounded with Chronic Disease.—The tumours which are

found in women under thirty years of age, and which are usually called scirrhus, are really only simple chronic enlargements, and are not disposed to malignant action, and do not absolutely require removal.

Does not always shorten Life.—When the disease occurs in very old persons, it does not in general shorten life; but the patient lives as long with it as probably she would have done if such tumour had not existed, and dies of some other disease. I saw a lady at eighty-six, who consulted me upon the propriety of an operation for this disease, and whom I advised not to submit to it; and, after several years, she died of another complaint.

Occurring at the Cessation of Menstruation.—The disease is supposed to occur more particularly at the cessation of menstruation, and which is really the fact, for it is frequently sympathetic with the uterus; but still the exceptions to this rule are very frequent. The symptoms are augmented by the approach of menstruation, and decline as the period is passing. The disease occurs more frequently in unmarried women than in others, and in women who, being married, have had no children, probably because the breast has not undergone that change for which nature had designed it, in being the fountain of nourishment to offspring; but yet pregnancy and nursing do not prevent the tendency to disease in some persons; for I have known a woman die of the complaint who had been pregnant seventeen times, and had ten living children.

If a tumour exists in the breast previous to the cessation of menstruation, a malignant action will occur in it at the period of its cessation, or soon after it.

Many Persons in a Family affected.—There are sometimes several persons in the same family who will be affected with this disease. A physician had three relatives, sisters, the first of whom had a scirrhus tubercle of the breast, of which she died. A second had the disease, which was removed by Mr. Lucas, sen.; the disease returned, and she died. The third has applied to me, from a very painful swelling in the breast; they were unmarried. Therefore, in a family in which one is affected, the first dawn of complaint should be carefully watched, and the general health be well attended to in others.

Progress of the disease slow.—The progress of this disease to its termination is always slow; but in some more so than in others; and it is well that patients, who must fall victims to the disease, should know that it often remains stationary, and that I have seen it in one instance seventeen years; one twenty-two years; in the last case the thigh bone was broken by a very slight accident; and, after several months, appeared to be united, and then again became broken, in an effort to remove her from bed. As I was examining the thigh bone, I observed her breast ulcerated, and asked her how long the disease had existed, and she said twenty-two years. The breast on the left side was absorbed, and a scirrhus swelling, with some enlargement, existed over a large portion of the skin, covering the pectoral muscle. Dr. Babington informed me, that he knew a lady, who had symptoms of the disease twenty-four years.

Cause of Scirrhus.—The cause of this disease is supposed to be some accidental blow, or the pressure of a part of the dress; but although a blow may produce a swelling on the bosom, yet that swelling will not be of a scirrhus nature unless some defective state of the constitution disposes to malignant action. If the constitution be good, the effects of a blow are speedily dissipated: but if the constitution be faulty, the swelling grows into a formidable disease. The complaint is, in part, constitutional, in part local. It is constitutional in so far as the disposition to malignant action is produced by the state of the habit. It is local also, because the action in the part is peculiar, and the result is a specific effusion different to that of common inflammation. A wound, therefore, made into the parts will produce, on scirrhus disease, a cancerous ulcer; but a wound made in removing the swelling heals like one in any other part of the body. So with respect to the constitution, unless it be changed by a medical treatment, the disease will return as the disposition to malignant action which continues will reproduce it.

Influence of the Mind in predisposing to Scirrhus.—Anxiety of mind, tending to the presence of slow fever, and suppressed secretions, are the predisposing causes of the complaint. A mother watching with anxiety a near and dear relative in sickness; deprived of her natural rest, and inattentive to the deviation from health in her own person, is often afterwards affected with this disease. A person, the prey of disappointment from reduced circumstances, and struggling against poverty, when her prospects begin to brighten, finds a malignant tumour in her breast; costive state of bowels, a dry skin, a paucity of other secretions have attended this anxious state of mind, and laid the foundation of that destruction which awaits her.

DISSECTION.

In the examination of persons who have died from this disease, besides the affection of the neighbouring glands, scirrhus tubercles are found in many other parts of the body, but more particularly in the thoracic and abdominal viscera.

CASE I.

In addition to the scirrhus deposit in the sternum of Mrs. Edge (already mentioned), scirrhus tubercles were found in the following situations:

In the integument covering each breast; in the glandular structure of the breast itself, and in the neighbouring absorbent glands; also in the substance of the pectoral and intercostal muscles.

Thorax.—On the pleura of each side, and on the pericardium, the cavities of which contained water; also in the substance of each lung.

Abdomen.—In the liver, pancreas, mesenteric glands, and uterus.

CASE II.

In the dissection of another patient, who died with an ulcerated cancer on the right breast, scirrhus tubercles had formed in the direction of the internal mammary artery on each side, but more particularly on the right; also in the intercostal muscles. The surface of each pleura, and the substance of each lung, exhibited numerous similar tumours. The bronchial glands were also enlarged from the same cause.

There seem to be three species of scirrhus inflammation.

Three Species of Scirrhus.—First, That producing a tubercle, which gradually grows to the size I have described.

Secondly, That which gives origin to a number of small scirrhus tubercles in several parts of the breast, affecting both breasts, and producing similar tubercles in various parts of the cellular membrane, in the lungs, and in the liver.

Thirdly, A scirrhus inflammation of the breast, which seems to involve the whole of the glandular structure, hardens the whole breast, which becomes attached firmly to the pectoral muscle, and to the skin, and often extends over to the opposite bosom.

LECTURE XXI.

ON THE TREATMENT OF SCIRRHUS TUBERCLE.

No specific remedy having been yet discovered for this disease, all that the surgeon can do is, to employ the constitutional treatment best calculated to keep the disease in check, by lessening inflammatory action.

Constitutional Remedies.—The same attention is required to the due support of the secretions, as in other complaints of an inflammatory kind; and the pill: hyd: subm: comp: in the quantity of from three to five grains at night, with compound infusion of gentian, soda, and rhubarb, form an excellent medicine in that point of view.

Steel has been recommended; but although it is useful in another form of disease of the breast, in this it often occasions a feverish heat; therefore it should not be employed unless in cases in which the uterine secretion is defective, and then the Plummer's pill at night, and the following draught twice per diem may be beneficial:

R. Vini ferri ℥j.
 Ammoniae carbonat: gr. vij.
 Aq: menth: virid: ℥j.
 Tinct: card: comp: ℥ss.
 M. ft. Haustus bis die sumendus.

Opiates.—Medicine must also be given to relieve the severity of suffering, and to subdue the agonizing pains with which the disease is often accompanied. The tincture of opium, the liquor opii sedativus, the black drop, are given in succession, as either form is losing its effect, combined with the camphor mixture, and a little of the spiritus ætheris comp. which is the best mode of administering them. A patient of mine in Guy's Hospital was much relieved by the stramonium, and this medicine may be given in the following form.

R Ext: stramonii gr. $\frac{1}{2}$.
 Camph: gr. 2.
 M. ft. pilula bis terve die sumenda.

Very small doses of belladonna sometimes succeed in diminishing the pain, and I have known bark also mitigate the severity of the symptoms.

As no specific has yet been discovered for this disease (for it would be infamous quackery to say, that any such remedy is known for it) medical men, instead of going over again and again trials of the same means, should endeavour to discover, amidst the numerous new articles of medicine with which chemistry has of late years furnished them, some remedy for this complaint.

When there is cough attended with dyspnœa and pain in the side, a small quantity of blood, viz., six or eight ounces, should be taken from the arm, and then the blood is usually covered with an inflammatory coat.

Effects of Climate.—Climate has been supposed to be likely to influence the progress of this disease; but so far as I have been able to learn, it has no favourable effect. A lady consulted me, with a scirrhus tumour in her breast, which was removed; soon afterwards her husband's mercantile affairs obliged him to go to the Island of Trinidad, and the wife accompanied him. She suffered greatly from sea-sickness in her voyage, and it might have been expected that this would have produced some change of action in the constitution. From the extreme warmth of the climate, some favourable change might have been expected to have arisen; yet, in a few months, the disease returned in the breast: and, finding that it was making considerable progress, she determined to return to England. I saw her soon after her return; but the change from a warm to a cold climate had produced no more favourable change than her visit to the warm temperature of Trinidad. The glands in the axilla were enlarged; the breast was ulcerated; her lungs had become affected; her body was emaciated; and it was evident she had but a short time to live. I also lately knew an English lady visit the south of Europe, when labouring under this disease, and there she died of it.

Vegetable Diet.—It is supposed that a vegetable diet, and food affording little nourishment is conducive to recovery. There is no greater mistake. Whatever weakens leads to an increase of the disease, and to a more rapid termination of the existence. Low living

renders the person irritable, quickens the pulse, and makes the constitution feel the disease more strongly. Vegetable diet has not the least beneficial influence over this complaint. Wine and fermented liquors, given so as to produce a quicker pulse, or heat of skin, are equally improper, as a feverish state is equally pernicious with the nervous irritability which low living produces. In short, diet has no specific influence, and that which has agreed best with the patient at other times is the most appropriate under this disease. Meat once per diem, and weak wine and water, as a drink at dinner, agrees best. The other meals, morning and evening, to be as usual.

Local Treatment.—The local treatment of the complaint consists in subduing inflammatory action; by perspiration; by wearing oiled silk; soap cerate, or a poultice of bread and poppy water; wearing a piece of fur upon the part, or a portion of hareskin, is found to tranquilize the disease.

Leeches.—As the pain is occasionally severe, and the disease seems to grow by occasional determinations of blood, it is right at these times to apply leeches; four or six of them may be used, but it is wrong to weaken the patient by their application; and therefore great numbers of them, or a frequent repetition of their application, is wrong. When the pain is excessively severe, it is right to apply the extract of belladonna with the soap cerate.

Cerat. saponis ℥j.
Ext. belladonna ℥j.
Ol. lavendulæ gtt.v.

M.

Poultices.—If there be a disposition to suppurative inflammation in the tumour, it is right to use fomentations and poultices.

When the part is ulcerated and is granulating, the bismuth ointment is a good application; as it also is to an appearance of erysipelatous inflammation on the surrounding skin. The unguentum zinci oxydi, under similar circumstances, may be of service. Chalk and opium I have seen applied with advantage.

When the sore is excessively painful, the following powder should be rubbed upon the parts twice in the day.

Pulv. cinchonæ ℥j.
— opii ℥j.

Misce.

If the surface of the sore manifests a disposition to slough, it is right to use a carrot poultice, or the nitric acid lotion.

When the arm swells, as it does on the diseased side towards the close of the complaint, it is necessary to apply a roller from the hand to the axilla, and to keep the arm from the side, to allow of as much freedom as possible to circulation and absorption, which are impeded in the axilla, if the arm approximates the side.

OF THE OPERATION OF REMOVING A SCIRRHOUS TUBERCLE.

Before the patient be submitted to the operation of having the disease in the breast removed, she will naturally inquire what danger it produces to life, and what prospect it affords of preventing a return. To the first of these the surgeon may confidently answer, that the danger of the operation is very slight ; for, in the immense number of cases in which I have performed it, I have lost but five patients : two of erysipelatous fever and inflammation ; one from hydrothorax, which was found upon dissection to be connected with the exterior of the disease into the chest, affecting the lungs and pleura ; one, a woman of great bulk, in whom the breast was very large ; and one from great age.

To the second question, the reply is made with more difficulty. A large proportion of cases return ; but fewer than formerly, if the patient, immediately after recovering from the operation, undergoes an alterative course of medicine.

The only Mode of Relief.—It may be truly said, in the present state of our knowledge, the operation furnishes the only hope of preventing the disease from proving destructive, with the exception of very advanced age, in which it makes little inroad on the constitution, and little progress in the parts.

Although the patient may not ultimately survive ; yet it may be said, that in cases in which the disease does return, the patient is generally preserved from a most painful and offensive state by the operation preventing ulceration.

On these accounts, I recommend the patient to submit to it. Hope is revived, and the only chance for life is given.

Parts to be removed.—If the nipple be drawn in, it should be removed with the tumour : if any cords or roots can be felt proceeding from it, they ought to be removed ; and if the skin adheres to the tumour, or be in the least inflamed on its surface, it ought to be removed.

It is not sufficient to remove the tumour, but the gland from the nipple to the tumour must be removed : and the surrounding parts, to some extent, must be taken away ; for the disease does not consist in the tubercle only, but there are roots proceeding from it into the lobes of the breast in its vicinity. It will be sometimes necessary to remove the whole breast, where much is apparently contaminated ; for there is more generally diseased than is perceived, and it is best not to leave any small portions of it, as tubercles reappear in them.

Mode of operating.—The operation consists in making two semicircular incisions, nearly perpendicularly, which meet at their points ; one on the axillary side of the swelling, and the other on the sternal ; the portion of skin over the disease should be removed. Each incision should reach the pectoralis muscle, which should be distinctly seen, and clearly exposed in the operation. As the arteries are divided,

an assistant should apply his finger upon them, until the whole of the parts to be extirpated have been removed.

Removal of Axillary Glands.—If a gland in the axilla be enlarged, it should be removed, and with it all the intervening cellular substance, as the absorbent vessels between the swelling and the gland are contaminated; for it is wrong, after removing a swelling from the breast, to make a separate incision to extirpate a gland; but it should be an extension of the first incision from the tumour to the gland.

If several glands in the axilla be enlarged, their removal does not succeed in preventing the return of the disease; some being still seated beyond the reach of the knife. I once saw the axillary vein opened in the operation of removing several of these glands; the gush of blood was considerable, but it was evidently of the venous character; and a dossil of lint, placed in the axilla, stopped the hæmorrhage, and the bleeding did not return.

Vessels carefully secured.—So soon as the operation is performed, the divided vessels are to be secured. From faintness and sickness the bleeding stops; but, as soon as action and warmth return, the vessels again bleed. It is therefore necessary to put a ligature upon each artery, for nothing is more annoying to a patient, or alarming to her friends, than after-hæmorrhages: the wound is obliged to be opened; the patient becomes faint; the bleeding stops, and the vessels concealed in coagula are difficult to find. Much time, pain, fatigue, and alarm are saved the patient, by attention in securing the vessels at the conclusion of the operation.

Use of a Suture.—In dressing the wound, put a suture through its centre, for it produces adaptation, and preserves it better than adhesive plaster. I used to object to a suture, but experience has shown me its utility. The emplastrum thuris compositum and emplastrum saponis p. æq. is the best which can be applied, being less apt to produce erysipelas than the common adhesive plaster.

If erysipelas arise in the surrounding skin, apply flour or starch to the surface.

Arm to be supported.—The arm should be supported in a sling. The ligatures may be drawn away in seven or eight days.

In those cases in which there is a general scirrhus inflammation of the breast, I never now perform the operation, because I never knew it succeed. In others, in which a number of tubercles form in the breast, the whole mamma must be removed.

After-treatment.—So soon as the patient has recovered from the operation, a medical alterative treatment should be pursued, to change the constitution and prevent the disposition to a relapse into the former disease.

ON THE FUNGUS OR MEDULLARY TUBERCLE.

Differs from Scirrhus.—This disease differs in many respects from the scirrhus tubercle.

Occurs at all Periods after Puberty.—First, It occurs at all periods of life after the age of puberty, although still more frequently after thirty years of age, than earlier. One of the worst cases I have seen of the complaint appeared at the age of twelve years, and destroyed life at sixteen. It began at the period of the evolution of the breast. It was removed by an operation when of large size : a small tubercle reappeared, and it was also subjected to operation ; but the disease again grew, and destroyed life.

Difference of Feel.—Secondly, this disease is not so hard as the true scirrhus, but has more the feeling of chronic inflammation at its early stages ; and as it increases it becomes softer, yields to the impression of the finger, but immediately again fills as the pressure is removed. At this period the skin is of the natural colour, and it so continues whilst the tubercle is in its adhesive stage ; but, after a few months, the skin becomes livid, and then a distinct fluctuation may be perceived from a fluid being found, which is contained in a cyst. The veins of the surrounding skin become extremely enlarged and varicose, and the surface assumes an inflammatory appearance, of a darker colour than common inflammation. The cyst next ulcerates ; or if opened, in either case, discharges a fluid, which has the character of bile, composed of serum with red particles, somewhat changed in their colour : the fluid leaves a yellowish red stain upon paper, and readily coagulates, as serum does, by exposure to heat. The appearance of the fluid differs so entirely from that which is contained in the hydatid cyst, that any one acquainted with the two diseases readily distinguishes the one from the other by it.

After the cyst has been opened, a fungus sprouts forth, which occasionally bleeds profusely, but the bleeding is easily stopped by pressure ; the discharge is excessive, wetting a handkerchief through in half an hour, and of a faint and most sickening odour ; the edges become everted ; a sloughing disposition manifests itself in some parts of the tumour, and occasionally in the whole of the swelling ; and I have known the entire disease slough away. I remember, during my apprenticeship at this Hospital (St. Thomas's), Mr. Cline had a case in which the tumour sloughed away, and the wound healed, after which the woman was discharged from the Hospital apparently cured ; but I am not certain if the complaint did or did not return. In general, however, the profuse discharge, the repeated losses of blood, and the production of similar disease in other parts of the body, lead to the destruction of life. The patient falls a victim to this complaint much sooner than to the scirrhus tubercle, in the majority of cases dying in a few months from the first discovery of the disease.

Less painful.—Thirdly, This disease differs from the true scirrhus in being much less painful ; in its earlier stages it is altogether free from pain ; and I have known it acquire great magnitude with little diseased sensation : even in its most formidable state it is seldom very sensitive.

Glands not affected.—Fourthly, The glands in the axilla are not generally inflamed in the same manner as in true scirrhus, by irritation

or absorption ; for I have known a person die of the disease without the axillary glands being affected : but in some instances they do participate in the disease. The cervical and internal mammary glands are also rarely affected.

Nipple not drawn in.—Fifthly, The nipple is not generally drawn in, nor is the skin puckered, having the appearance of cicatrix, as in true scirrhus.

Thus this disease may be distinguished from scirrhus by a less circumscribed and more diffused inflammation ; by less hardness ; by the formation of a cyst ; by the extreme varicose state of the veins ; by the fungus which sprouts from it after ulceration ; by profuse bleedings ; by extensive sloughing ; by less pain ; by a quicker progress to destruction ; by the absence of retraction of the nipple ; by the want of puckering of the skin ; and by the glands being less affected in the course of absorption.

Health at first unaffected.—The patient's constitution at first appears to suffer but little ; but after a time, when the process of ulceration begins, she becomes sallow and emaciated ; and from the frequent losses of blood has an extremely cadaverous appearance.

DISSECTION.

Adhesive Stages.—The tumour, in its adhesive stage, appears lobulated like an adipose swelling ; but the substance, which is effused by the inflammation is more compact, and varies in colour ; in some parts assuming the character of common adhesive matter, in others it is softer and mixed with red particles of blood. In its next stage it forms a cyst, which contains the fluid that I have described ; and from its interior it is that the fungous growth proceeds, and this has the appearance, when cut through, of soft organized matter ; in some parts extremely vascular, in others of the semblance of coagulated blood ; other cysts are found containing bloody serum, and a semifluid mass, looking like putrid brain, or sometimes like cream tinged by the colouring particles of the blood.

Origin.—It adheres to tendinous structures more than others in its commencement ; for example, to the aponeurosis of muscles, as that of the pectoral. I have seen tumours of this kind arise from the deltoid aponeurosis, from the sheath of the femoral vessels, and from the tunica sclerotica ; but still the cellular structure, in each part of the body, may become affected by it. In the dissection then of these cases we meet with the glands in the axilla sometimes slightly enlarged ; and next, tumours, in various parts of the cellular tissue, in great numbers ; the lungs I have seen loaded with them : the liver is generally tuberculated, and I have seen one kidney affected. The uterus has soft tumours on its surface, and sometimes a polypus growing from its interior, which has been called by that able accoucheur, and excellent man, Mr. Clarke, the cauliflower excrescence, or polypus uteri. I have known almost every internal organ affected by it, even the brain itself.

CAUSE OF THE FUNGOID DISEASE.

Constitutional.—It is evident, in a disease which affects several different parts of the body, out of the line of absorption, that a constitutional cause must exist to produce it: yet it has also a local malignant action, so that a part shall become diseased whilst the surrounding parts still maintain their natural functions. Thus the disease is formed of a constitutional disposition to the complaint, with a local specific action. Upon removing these tumours, the surrounding surfaces generally heal rapidly, and without any malignant action being observed upon the wounded part. The incision, in removing these tumours, must, however, be extended into the healthy parts, at a considerable distance from the diseased; for if there be inflammation in the vicinity of the tumour, the malignant action will recur in it. I have known, in amputating a limb above the elbow, for this disease in the elbow joint, the skin inflamed between the elbow and shoulder, and the stump assumed the fungoid character. Carefully, therefore, avoid cutting near the diseased part, or the complaint will be certain to return.

Predisposing Causes.—The predisposition to this disease in the constitution is founded upon anxiety of mind, and on those circumstances which have a tendency to destroy the regular and natural functions of the body.

TREATMENT.

As the disease is founded in a constitutional change, and in specific local action, the objects in the treatment will be to correct the general health and to destroy the local and specific action. The first is to be attempted by the alterative medicines already recommended, viz.,

Pil. hyd. subm. comp.

and a bitter infusion with rhubarb and soda.

But we are at present entirely unacquainted with any constitutional means, or local application, which has influence over the disease when it has once been manifested.

Pressure.—Pressure has been used to produce a slough of the fungus, and it is proper to give it a trial; but it is acting only upon the effect, and will not prevent a fatal termination, as the cause will still remain. Aluminous applications are useful in preventing the growth of the fungus, and the sulphate of iron has a good effect in the same point of view; but I know of nothing which has a specific action upon the sore.

Its Removal by Operation.—It is therefore necessary to remove this disease by operation; and, upon the whole, it less frequently returns than the scirrhus tubercle, if care be taken to extend the operation properly into the sound parts.

The operation presents none of those difficulties which have been

described ; for it has been said that the vessels are large, and that they bleed so profusely as to occasion dangerous hæmorrhage. It is true, in the swelling they are large : but the arteries of the surrounding parts are but little augmented, and I have never seen any dangerous bleeding from their division. It is certain that the veins particularly, and the arteries of the part, if cut, bleed freely ; but they ought not to be divided in the operation, which should be extended beyond its limits : they bleed not only from their size, but from the difference in their structure, having little contractile power.

After the operation, as in scirrhus, the constitution will require an alterative treatment, to prevent the disposition to returning disease.

OF THE SIMPLE CHRONIC TUMOUR OF THE BREAST.

This disease is not of a malignant nature, nor does it produce any dangerous consequences. It attacks the young and the apparently healthy, seldom beginning after the age of thirty years ; and usually appearing from the age of puberty to that period.

Appearance of the Swelling.—The character of this swelling is as follows :—It is very superficial, growing rather upon the surface of the breast than in its interior. At first it feels like one of the mammary lobes being enlarged : and then, as if several were combined in one swelling. As it increases it becomes in some degree lost in the substance of the breast. It has not the hardness of the scirrhus tubercle, and it is not accompanied with the loss of health of the fungoid disease. It is an extremely moveable swelling. It is generally unaccompanied with pain, either in the part, or shoulder, or arm, although I have known exceptions to this rule. It grows very slowly and gradually, and does not generally acquire a great magnitude. I removed one which had existed five years, which was not larger than a walnut ; and I have seen one which, after fifteen years, still remained but a small swelling.

Sometimes acquires a large Size.—In a patient sent me to Guy's Hospital, by Mr. Lukyn, of Feversham, the swelling had grown to a great magnitude, but still felt as if composed of a simple enlargement of the different lobes of the mammary gland. I have also seen one case, in Guy's Hospital, in which the disease became excessively large, and it ulcerated and destroyed life. They will be sometimes painful at the period of menstruation : there is nothing malignant in their nature, and I have never known them change their action into the scirrhus or fungous disease, although under changes of the constitution such an event would be possible. The absorbent glands in the axilla are unaffected.

Diagnosis.—The diagnosis of this disease consists in the youth of the patient ; in the absence from pain ; in the appearance of general health ; in the slow growth of swelling ; in its superficial situation at first ; in its extreme mobility ; in its feel being that of the lobes of the breast enlarged, and therefore it is a conglomerate tumour ; the glands in the axilla being free from disease.

Dissection of the Tumour.—Upon dissection, the swelling is found to be composed of a number of lobes connected together by a condensed cellular tissue, and which appear as enlargements of the lobes of the mammary gland. These lobes are composed of smaller, which by maceration may be separated. The appearance of the disease, when cut into, is that of sweet bread, that is, lobulated in every part, or composed of large lobes, which are divisible into smaller.

Cause.—The cause of the disease is unknown. I have heard it frequently attributed, by the patient, to the pressure of the bones in her stays, or that of some part of her dress.

Treatment.—In the treatment of this disease little is effected by medicine. I generally order the emplast: ammon: \overline{c} hydrargyro to be applied to the part, and give hydrarg: \overline{c} cretâ with soda and rhubarb, but the disease rarely disappears. The great gratification which the patient receives in this case, is from the assurance that the complaint is not of a malignant nature.

Removal by Operation.—If the disease increases in spite of an alterative treatment, and the patient becomes anxious for its removal, there is very trifling risk from the operation, for I have frequently performed it at my own house, and the patients have returned home immediately afterwards. When, however, these swellings grow to a very large size, the vessels supplying them become extremely increased; and I remember seeing one removal from the left side, in which case the vessel that supplied the tumour was so large as to afford a gush of blood, which alarmed the surgeon, from the idea of there being some communication between the tumour and the interior of the chest. When they are small, as they usually remain, it is right to secure each vessel which continues to bleed, however slightly, or the wound will be obliged to be re-opened to secure it.

OF THE ADIPOSE TUMOUR.

In the breast a fatty swelling is sometimes formed. A Mrs. Smith, of Great Yarmouth, applied to me, with an enormous tumour in her bosom. As her general health was good, I advised its removal. It weighed fourteen pounds and ten ounces: the gland of the breast was placed before it. The preparation is in the Museum at St. Thomas's Hospital, and she recovered very quickly. The incision for its removal was thirty-two inches in circumference.

OF THE IRRITABLE TUMOUR.

Occurring in Young Persons.—This disease generally occurs in young women from the age of fifteen to thirty; the swelling never acquires magnitude, and is distinguished from those which I have described by the following circumstances:

Diagnosis.—A lobe of the breast is slightly swollen ; it is extremely tender to the touch, and, if handled, the pain sometimes continues for several hours. The uneasiness is not seated in the swelling only, but extends to the shoulder and axilla, down the arm to the elbow, and frequently to the wrist and fingers. It is very much increased prior to menstruation, is somewhat relieved during the period, and decreases after its cessation. The pain is sometimes so severe as to destroy rest ; and even the weight of the breast in bed is sometimes almost intolerably painful.

Produces vomiting.—When the pain is most severe, the stomach sympathizes, and vomiting is produced. The skin is undischoloured, and there is no external mark of inflammation. Sometimes only a small portion of the breast is affected ; at others, the greater part of the bosom ; and I have known it affect the breast on each side.

The constitution is highly irritable and sensitive, the hair of the patient is usually light, the complexion extremely delicate, and the temperament sanguineous.

Continues for a long period.—I have often known this disease continue for many months, sometimes for years ; and once during twelve years.

Not Malignant.—It has not a malignant tendency, does not therefore produce any dangerous effect, and not only does not require an operation, but such a measure would be quite unjustifiable.

Very frequently this disease is accompanied with an amenorrhœa, or with great paucity of menstruation, paleness of its colour, and frequently it is attended with profuse fluor albus.

Cause.—Its causes are irritability of constitution, generally a defect of uterine secretion, and often its immediate exciting cause is a blow.

Local Treatment.—In the treatment, local irritability is to be diminished by the application of the belladonna in extract, or opium mixed with the ceratum cetacei ; the extractum conii ; or the recent conium in a poultice is beneficial. A plaster of soap cerate, to produce perspiration, or the application of hare skin, or some other fur, or the oiled silk applied with the same view, are to be found useful.

Leeches.—Leeches are sometimes employed when the pain is excessive, and the vessels of the breast are unusually full. If too frequently used, they produce debility, and add to the irritability of the system.

Constitutional Treatment.—The constitutional treatment consists in diminishing constitutional irritability, by restoring defective secretion, in giving tone to the system, and in acting particularly on the uterine secretion.

Medicines.—The usual medicines are small doses of calomel and opium, combined with a mild aperient, but those which best agree are the mistura myrrhæ c. ferro, or the ferrum ammoniatum ; under the continued use of which the disease gradually disappears. Rhubarb and soda, or these combined with columba, I have also seen very useful.

Conium, combined with rhubarb, I have known beneficial.

OF THE OSSIFIC TUMOUR OF THE BREAST.

Case.—The following is a case of this disease :—Mary Farmer, aged thirty-two, had a swelling in the breast for fourteen years, which had been painful during the later seven.

The pain was very severe : the skin over it felt hot, and required the constant application of evaporating lotions to keep it cool. The tumour was excessively hard, and very painful before menstruation, but greatly relieved after it.

Various applications, as poultices, fomentations, stimulating plasters, did not dispose it to suppurate ; in short, all the means employed proved useless. When she consulted me, I thought, from the state of the health, the mobility of the tumour, and its peculiar feel, that it was not cancerous ; but still I recommended its removal, to which she consented.

Dissection.—Upon examination of the swelling, after the operation, it was found to be composed in part of cartilage and in part of bone, the greater part of the former being ossified.

OF THE LACTEAL TUMOUR.

Symptoms.—Some time after delivery, a woman applies to a surgeon with a fluctuating tumour in the breast, of very considerable size, attended with painful distension, but without discolouration. The veins of the breast are very large. A lancet being put into the swelling, milk is discharged in large quantity, sometimes to the extent of several ounces ; which, after it has stood for some time, separates a cream upon its surface.

Cause.—The cause of this complaint is the obstruction of one of the lactiferous tubes near the nipple, or in it.

Treatment.—Its treatment consists in leaving the opening made by the lancet to discharge the milk which that part of the breast secretes. The swelling then gradually subsides as the milk in the breast disappears.

I, in one case, saw great inflammation follow the opening : but still it is the only means of relief, unless when the opening be made the child be weaned, and the secretion of milk be arrested, and then the continuance of the opening will be unnecessary.

BREASTS LARGE AND PENDULOUS.

These glands sometimes grow to an enormous magnitude, about the age of twenty years, so as to hang down upon the abdomen, not from relaxation but from real increase. I saw a case of this kind in a young woman, aged twenty-three, which began three years prior to

my seeing her ; tender to the touch, of a dark red colour. She was often costive, but regular in her menstruation.

Dr. Babington and myself witnessed the following case :

Case.—Miss L., aged seventeen years, of a light complexion and delicate constitution, who is naturally costive, has a remarkable enlargement of her breast. The left is twenty inches from its junction with the chest above to its lower part, and its circumference measures twenty-three inches. The nipple is flattened, the areola excessively expanded. The breast feels as if every lobe of the mammary gland was increased to several times its usual magnitude.

Treatment.—The treatment consists in supporting the breasts in a suspensory bandage, in which each breast is received, and this is fixed over the shoulders.

The medicine best calculated to be useful is hyd : c. cretâ with rhubarb and soda.

THE MILK ABSCESS.

Treatment.—This abscess requires the same general treatment in its adhesive, suppurative, and ulcerative stages, as we have recommended for abscesses of other parts. In general I leave them to break spontaneously ; but there are two exceptions to this.

First, when the constitution and patient are suffering severely, and the abscess is slow to break, it is right to assist nature with the lancet.

And, secondly, when the abscess forms at the back of the breast very deeply, the aid of an artificial opening is required.

Formation of Sinuses.—When they ulcerate, sinuses, difficult to heal, are sometimes produced ; and the best treatment is to inject them with a solution of sulphate of zinc, or a dilute sulphuric acid, and to apply it constantly over the breast by linen.

LECTURE XXII.

ON URINARY CALCULI.

Where seated.—URINARY calculi are found in the kidney, in the ureter, in the bladder, and in the urethra.

Calculi in the Prostate, not urinary.—The calculi which are met with in the prostate gland, are not urinary ; they are formed in the ducts of that gland, into which the urine does not gain access, and they generally differ from urinary calculi in their composition.

OF THE RENAL, OR KIDNEY CALCULUS.

Symptoms.—The symptoms by which the presence of a calculus in this organ is known are, 1st, pain in the loin, in the situation of the kidney, which pain extends forwards towards the navel accompanied with a sense of numbness in the bowels, and downwards to the spinous process of the ilium. The pain is of an obtuse kind, it often produces a sympathetic effect on the stomach, and occasions vomiting. The loin is so tender, that the least pressure on it occasions great suffering to the patient. The act of stooping, when a stone exists in the kidney, produces acute pain in the loins, and is sometimes followed by a discharge of bloody urine.

Case.—I knew a gentleman, who, in stooping on his horse to open a gate, felt severe pain in the loins; he immediately discharged bloody urine, and afterwards felt the symptoms (hereafter to be described) of a stone passing from the kidney by the ureter. He voided this stone by the urethra, four days subsequent to the first attack of pain in the loins.

The presence of a stone in the kidney is sometimes manifested by extreme irritability of the bladder.

Case.—A chemist, in the city, had frequently consulted me (when I lived there) for an irritable state of his bladder and urethra, for which I had recommended various medicines, and bougies had been passed; but he did not experience any relief from their employment. After I left the city, I was informed that he was dead; and upon inspection of his body, no disease of the bladder or urethra was found, but a large stone was discovered in the kidney.

Sometimes removed by Ulceration.—Nature sometimes succeeds in removing these extraneous bodies by a process of ulceration; an opening being formed in the loins, through which a stone can be felt, by passing a probe, and by which the calculus is ultimately discharged.

Case.—A person came to consult me from the country with two openings, one above and one below the last rib, through which three calculi had been discharged. Dr. Marcet analyzed these, and found them to be composed of the ammoniaco-magnesian phosphate.

Opening to be dilated.—If the calculus cannot readily pass, from the small size of the opening, the aperture should be dilated by sponge tent; if this fails, a bistoury may be carefully used, as the artery and vein are before the stone.

A stone in the kidney, when very large, may, in some instances, be felt through the loins. Mr. Cline informed me, that a patient consulted him who had this disease, in whom he could distinctly feel the stone, by pressing firmly on the loins; the patient's general health would not at that time bear an operation, otherwise Mr. Cline would have removed the stone by incision.

Upon dissection of persons dying with calculi in the kidney, there are found:

1st, Sometimes numerous small calculi, like grains of sand, in the tubuli uriniferi.

2dly, A stone, lodged in an infundibulum, or often several, occupying different infundibula.

3dly, A large stone in the pelvis of the kidney, connected by processes to others, seated in the infundibula.

Kidney enlarged.—The kidney is sometimes scarcely altered in its size, at others it becomes considerably enlarged. If the stone interrupts the passage of the urine to the ureter, the glandular structure of the kidney becomes absorbed, the pelvis and infundibula extremely enlarged, and these membranous bags with the capsule of the kidney only remain.

Ulcerates.—Sometimes ulceration of the kidney is produced ; it enlarges, then wastes, and gradually becomes in a great degree absorbed ; matter is discharged with the urine ; high constitutional irritation succeeds, and if both kidneys be effected, the life of the patient is destroyed.

TREATMENT.

Medical.—The medical treatment of stone in the kidney consists in giving the liquor potassæ ; the carbonate of potash, or soda ; not that they dissolve the stone, but they prevent the formation of uric acid ; the stone becomes encrusted with triple phosphate, which is a softer substance, and, perhaps, less irritating to the surfaces on which it rests ; these medicines also deaden the sensibility of the organ itself. If much pain be felt in the loin, the daily exhibition of a purgative, occasional cupping, or the application of a blister to the loins, will be useful. If there be a suppurative discharge, an issue should be made in the lumbar region.

OF STONE IN THE URETER.

Symptoms.—The presence of a calculus in this tube is shown by pain being felt near the spinous process of the ilium, and in the direction of the psoas muscle, if pressure be made upon it through the abdominal muscles ; the pain extends in the course of the anterior crural nerve, as the stone descends over the lumbar nerves which form it ; also to the testicle, as the stone passes the spermatic plexus ; and spasmodic contractions of the cremastic muscle occur, as it passes under the spermatic vessels. The patient is sick, often vomits, is covered with a cold perspiration, and is unusually pallid.

Case.—The pain is sometimes so severe, that a gentleman, who had several times suffered from this disease, informed me, that once, when a quarter of a mile from his house, he was seized with this pain, and fell on the ground, being unable to walk until his servants came to his assistance, and carried him home.

Pain not constant.—The pain has remissions, and the patient is

flattered with the hope of the stone having passed the ureter ; but after a few minutes, it returns with equal violence, and it is only after repeated attacks that it escapes into the bladder.

Calculi in the ureter, I have known destroy life in the following instances :

Case.—Mr. Cline had removed a stone from a boy in St. Thomas's Hospital, by the operation of lithotomy ; the boy had recovered from the operation, when he was seized with rigors, great pain in the course of the ureter, and vomiting ; a swelling formed just above the seat of the cœcum, in the right iliac region, which gradually increased, and the boy's constitution quickly gave way. On examination after his death, the pelvis of the kidney and the ureter were found distended with matter ; and at the end of the ureter, near the bladder, a stone was discovered, which had prevented the escape of the urine and of matter into the bladder, and thus occasioned death. The preparation of the diseased parts is in the Museum at St. Thomas's Hospital.

Case.—Mr. Hallam, of Walworth, gave me a preparation of a stone, stopped in the ureter, which was taken from a patient of his, who had for a length of time discharged matter from the colon per anum ; nature had formed an opening for the escape of the urine and pus, in this case, first by producing adhesion between the ureter and colon, and then by making a communication between the two by a subsequent ulcerative process.

Case.—We have another curious preparation of a stone in the ureter, surrounded by an abscess, taken from a patient who came to my house for advice. She had great pain in her loins, and tenderness in her abdomen, with so much fever as led me to suppose that she had but little time to live ; I advised her to apply to a Mr. Smart, a surgeon, in my neighbourhood in the city, who sent to inform me, a few days after, that she was dead, and that he had permission to inspect the body. Upon making an incision into the abdomen, there issued a strong urinous smell, and a watery fluid, mixed with matter. The intestines were inflamed and adherent ; the bladder was small ; one kidney was much enlarged and the other unaltered ; the ureter of the enlarged kidney was greatly increased in size and full of matter ; it was completely closed at the lower part by a calculus, and had given way above, so as to allow of the escape of the urine and matter into the abdomen.

A calculus may be discharged from the ureter by ulceration through the muscles of the abdomen.

Case.—Mr. Stone, of Mayfield, Sussex, gave me a calculus, which was discharged from a man who worked as a gardener. An abscess formed near the anterior superior spinous process of the ilium, from which this calculus and a quantity of matter were discharged. The man recovered.

TREATMENT.

Bleeding.—If the pain is very severe during the passage of the stone, the patient should be bled largely, to produce relaxation of the ureter,

that it may yield to the pressure of the stone and urine, and he should be put into the warm bath, to aid such relaxation. Opium and the liquor potassæ should be given, to allay irritability ; and the abdomen should be fomented and gently rubbed from above downwards, in the course of the ureter, in order to assist mechanically the passage of the calculus.

OF STONE IN THE BLADDER.

Symptoms.—The symptoms change so soon as the stone quits the ureter and enters the bladder ; the patient is relieved from the pain in the course of the ureter, in the testis, and thigh, but suffers usually in the following manner :

Pain in the Urethra and at the Frænum.—1st. He experiences acute pain, particularly opposite to the frænum, but also along the course of the urethra ; this varies in its degree, more according to the irritability of the patient, than the form or roughness of the calculus : the pain is sometimes slight, but generally severe, and is described by the patient as a cutting sensation ; or, sometimes, as if boiling water or lead were passing through the urethra. Relief is experienced by pressing on the glans penis, and adult persons do so ; children nip and draw the prepuce until the latter becomes excessively elongated ; they also, under severe suffering, after passing urine, cross their legs, and press upon the organs of generation with great force.

The adult, when voiding his urine, often rests his head against the wall, bends his knees, and relaxes the muscles generally.

Pain after the Discharge of Urine.—The pain is felt more after discharging the urine, when the bladder contracts around the stone, than before it is voided.

Frequently the fæces pass at the same time with the urine, and a prolapsus ani is a common consequence of the excessive action of the muscles of the perineum and lower opening of the pelvis, more especially in children. I have seen the abdominal muscles thrown into violent spasmodic actions for some time after the discharge of the urine, in some of the worst cases of stone.

Bladder Irritable.—The bladder is very irritable, is capable of retaining but little urine, and becomes diminished in size.

Sudden Stop to the Flow of Urine.—Often, as the urine is discharging, a sudden stop to its flow is produced with violent pain, from a stone falling on the beginning of the urethra and acting as a valve : as the force of the bladder's contraction lessens, the stone recedes a little, and the urine again escapes. Patients, therefore, pass their urine best in a recumbent posture, as the stone does not then fall upon the neck of the bladder.

At first no change is produced in the appearance of the urine, which can direct the judgment ; but when the disease has existed for some time, and more especially from violent exercise on horseback, or in a

rough carriage, the urine becomes bloody. A person having a stone in the bladder cannot ride far on horseback without dismounting to pass his urine ; and is obliged to quit a carriage often for the same reason.

Discharge of Mucus.—As the disease increases the bladder becomes more irritable, the urine is loaded with mucus, and sometimes precipitates a white sediment, composed of flakes of adhesive matter, thrown out by the mucous membrane of the bladder, when it has become inflamed. This state is often attended with rigors, succeeded by heat, and other symptoms of intermittent fever, and matter is sometimes discharged with the urine. The mucous membrane of the bladder becomes ulcerated when a stone has existed long ; the patient loses his health ; is incapable of getting sufficient rest ; and thus he is destroyed by the disease.

A person labouring under this complaint walks with excessive care ; he does not raise his feet much from the ground, to prevent any shock to the body, which would create pain and occasion spasmodic action of the bladder ; he also lies down with great caution, as the sudden change of posture might alter the position of the stone and produce irritation.

DISSECTION.

Mucous Coat.—In examining persons who die with a stone in the bladder, the mucous membrane appears loaded with blood, it is thickened, and highly villous. Its muscular coat is much increased, and the capacity of the bladder lessened. Numerous sacculi are sometimes formed, the mucous membrane being forced between some of the muscular fibres, and, in these bags, stones are wholly or partially received. We have a preparation in the Museum showing this state of the bladder, with stones lodged in these sacculi.

Ulceration of the Mucous Coat.—I have seen ulceration of the mucous membrane, and we have an example of stones ulcerating the basis of the prostate, and making their way into the urethra.

Bladder contracted in part.—We have also another very curious specimen, in which the upper part of the bladder had contracted around the stone, whilst the lower part is in the natural state.

A stone is often found with an enlarged state of the prostate gland ; and in some cases is met with in a bag, formed directly behind the prostate.

Hour-glass contraction.—We have a preparation showing an hour-glass contraction of the bladder, in which one large stone is lodged in the superior part, and several in the inferior ; and another, exhibiting a stone in the bladder, with a large fungus growing from the prostate gland.

Ureters.—The ureters are dilated, the kidneys enlarged ; sometimes one is enlarged and the other wasted from an ulcerative process.

Size of Calculi.—The size of calculi generally varies from a drachm to two ounces ; but the weight is not always proportioned to the size, but depends upon the composition of the stone.

The largest stone, which I have successfully extracted, weighed near six ounces. At the Norfolk and Norwich Hospital there is one of eight ounces. Mr. Mayo, of Winchester, removed one, in fractured portions, of fifteen ounces. I have one in my possession which I extracted, but not successfully, weighing sixteen ounces. We have a model of a stone, given to the collection by Mr. Foster, which, I understand, was twenty-five ounces in weight. One in Trinity College library, at Cambridge, weighs thirty-two ounces and seven drachms. But the largest stone which has been found in the human body is that given to the College of Surgeons by Sir James Earle, this weighed forty-four ounces.

Pain not more severe from a large Stone.—The severity of the symptoms is often in an inverse ratio to the size of the stone ; which, when it is very large, produces less pain, because the urine dribbles away, or is voided by very slight contraction of the bladder.

Number of Calculi.—The number of calculi is very various ; but in the majority of cases only one is found ; two or more not unfrequently exist. I have extracted nine in one case, thirty-seven in another, and the greatest number I ever extracted in the operation was one hundred and forty-two ; these were from Mr. Allis, of Worcester, a patient of Mr. Carden ; I have them now in my possession, many of them are about the size of marbles.

Removal of a number of Stones not dangerous.—A great number of stones does not add much to the patient's danger in the operation ; for it is not the frequent introduction of the forceps into the bladder, but the violence which is used in extracting the stone or stones which produces mischief ; thus the removal of one large stone is more to be dreaded than that of many small.

Stones rounded or hollowed, when more than one.—When more than one calculus exists, the first extracted is found smooth, and often hollowed by the friction of the others ; so that the form of the first shows the existence of a second or more.

Form of Stones.—The form of stone varies extremely ; but when there is only one, it is generally oblong ; when more than one, they are usually rounded and smooth ; and when very large, they assume the form of the bladder.

Surface of Stones.—The surface of stones is sometimes smooth, as the uric acid calculus ; a little irregular when composed of triple phosphate ; and very rough if formed of the oxalate of lime : this latter is called the mulberry calculus. But the severity of the symptoms does not always depend on the irregularity of the surface of the stone, but on the irritability of the bladder.

Composed of Lamellæ.—Calculi are generally composed of concentric lamellæ, formed upon a centre, called the nucleus. The colour of the different layers varies considerably, and the materials of which they are composed are of very different nature : some calculi are brown, some are white.

Nuclei.—The nucleus, or centre, is often some extraneous body introduced into the bladder, as a portion of coagulated blood, a piece of bougie, or catheter.

In the collection at St. Thomas's Hospital are preparations exhibiting various foreign bodies, as forming the nuclei to stones ; as a portion of slate pencil ; a needle, which had traversed a part of the body previous to its entering the bladder ; also a piece of tobacco pipe, which had been introduced into the urethra by the patient, to relieve some impediment to the passage of the urine, it broke and passed into his bladder, and was extracted some time afterwards by Mr. Godwin, surgeon, at Derby, with a stone formed around it. Sometimes a small stone of uric acid forms in the kidney, and descending by the ureter into the bladder, it there acquires an increase from the formation of a calculous deposit on it, of a different nature.

COMPOSITION OF URINARY CALCULI.

My friend, Dr. Dowler, who has paid much attention to the analysis of these calculi, has favoured me with the following account :

Urinary calculi of the human body may be comprehended under the following species.

1. Lithic acid, or uric acid calculus.
2. Lithate of ammonia.
3. Phosphate of lime, or bone earth.
4. Triple phosphate, or phosphate of magnesia and ammonia.
5. Oxalate of lime, or mulberry calculus.
6. Cystic oxide.

Besides these, other substances have been mentioned as forming distinct species of calculi, such as Xanthic acid, carbonate of lime, and the fibrinous calculi ; but they are of extremely rare occurrence.

The above calculi present the following chemical characters.

1.* Lithic acid calculus. Before the blowpipe it blackens and emits a peculiar smell, somewhat resembling that of burnt feathers ; it is soluble in the caustic fixed alkaline solutions by the assistance of heat, and is again precipitated from these by the addition of an acid. The nitric acid dissolves and decomposes it with effervescence ; if the solution be evaporated to dryness, a new acid, called the purpuric, and ammonia are formed ; these, uniting, produce a purpurate of ammonia, which is of a pink colour, and soluble in water.

2. Lithate of ammonia. By the addition of a caustic fixed alkali, ammonia will be disengaged. The lithic acid may be shown by treatment with nitric acid, as in the former instance. When mixed with triple phosphate, its presence is ascertained with difficulty. It is more soluble in water than the lithic acid calculus, and is of a clay colour ; but its characters have not as yet been sufficiently investigated.

3. Phosphate of lime. Before the blowpipe, it first blackens, then becomes white, and afterwards resists the action of heat. If, after being

* I have omitted every character which is not essential to the particular species.
—D.

heated in order to decompose the contained animal matter, it be dissolved in very dilute nitric acid, the subsequent addition of nitrate of silver will produce a yellow precipitate, which is a phosphate of silver, and of course indicates the presence of phosphoric acid. The lime may be detected by adding oxalate of ammonia to the above nitric solution.

4. Triple phosphate. Before the blowpipe, it emits an ammoniacal smell, becomes reduced in size, and at length melts with difficulty. The caustic fixed alkalies disengage ammonia. It is very soluble in dilute acids, and the subsequent addition of ammonia causes it to be precipitated in a crystalline form.

Oxalate of lime. When heated by the blowpipe it swells, its oxalic acid is decomposed, and the lime is left in the caustic state. When digested with carbonate of potash, a double decomposition follows; and the oxalate of potash, thus formed, presents its peculiar characters, which are indicative of the presence of oxalic acid.

6. Cystic oxide. This calculus may be readily distinguished by its external appearance. Before the blowpipe it emits a peculiar and fœtid odour. It is soluble in a solution of the neutral carbonates of soda and potash; also in those of the caustic alkalies, and most of the acids. Its solution in nitric acid is precipitated by alcohol.

The Xanthic oxide, of which only one specimen has as yet been observed, was so named by Dr. Marcet, from the circumstance of its producing a peculiar yellow compound with nitric acid.

Carbonate of lime is sometimes, but very rarely, met with, forming small urinary calculi. These effervesce in dilute muriatic acid, and a precipitate is formed by the addition of oxalate of ammonia to the muriatic solution.

The fibrinous calculus, observed by Dr. Marcet, was probably formed from the fibrin of blood which had accidentally escaped into the bladder: it possessed the usual character of fibrin.

Mr. Brande analyzed one hundred and fifty stones, from the collection of Mr. Hunter, and the materials of which they were composed were as follow:

Uric acid	-	-	-	-	-	16
Uric acid plus, triple phosphate minus	-	-	-	-	-	45
Uric acid minus, triple phosphate plus	-	-	-	-	-	66
Triple phosphate	-	-	-	-	-	12
Uric acid on phosphate nuclei	-	-	-	-	-	5
Oxalate of lime	-	-	-	-	-	6

In addition to these, Dr. Wollaston found one of the cystic oxide; but Dr. Marcet met with this stone in the kidney: it is not composed of lamellæ, like the other calculi.

TREATMENT.

Medical Treatment.—With respect to the medical treatment of calculi, I do not believe in the power of chemistry to dissolve a stone in the bladder, if it acquire any considerable magnitude. The medicines, given for this purpose, become so much changed in their passage through the circulating and secreting system, that their chemical influence is in a great measure destroyed. They may alter the surface of a stone, so as to render it soft and less irritating ; but they do not prevent a calculous secretion.

Case.—Dr. Baillie and myself attended a gentleman from Birmingham, who secreted a large quantity of triple phosphate, which appeared in white crystals in his urine : we gave him the muriatic acid, and the secretion of the triple phosphate ceased, but uric acid was produced in equal abundance : he had then alkalies given to him, and the triple phosphate reappeared ; he was at length, but not under many months, cured by attention to his diet and general health.

Case.—I had a patient in Guy's Hospital with a stone in his bladder, in whom various experiments were tried to dissolve the stone by chemical menstrua. A catheter was introduced into the bladder, and through it injections were thrown ; thus an opportunity was given for a direct application of the menstruum to the stone. After a lapse of time, I said to this man, "Well, have my medical friends dissolved the stone?" his answer was, "No, Sir, and I have given up all the injections except opium, from which I receive considerable relief." The patient died in the Hospital, and, on examination after death, a stone was found in his bladder.

Alkalies may lessen the sufferings.—But although a stone cannot be dissolved in the bladder, yet the irritability of the latter may be so far diminished by alkaline remedies, as to enable the patient to bear the disease with much less suffering.

Case.—Admiral Douglas was the subject of stone ; I sounded him, and in the evening of that day a portion of the stone was discharged by the urethra, and I sent it to my friend Dr. Marcet for analysis, who found it to be oxalate of lime ; I therefore gave him acids, but he was not relieved by their use ; he then took subcarbonate of soda ζ ss four times in the day, in some water. Some months afterwards I was requested to meet Dr. Reynolds and Sir E. Home in consultation upon the case of the Duke of Portland ; and when I entered the room, Sir Everard said, "Cooper, how did you dissolve the stone in Admiral Douglas?" to which I answered, "I never dissolved a stone in my life."—"But," said Sir Everard, "he expresses himself well from some medicine you ordered him." I called in consequence on the Admiral at his hotel ; when he said, "You saw me in dreadful agony, unable to cross a room ; but since I have taken the soda, I went from Yarmouth, in Norfolk, to Portsmouth by land, and bore the journey well ; and I could now go down a country dance." Yet the stone still

existed in his bladder ; but the soda had lessened its sensibility, so as to enable him to bear the complaint without much suffering, and only a little inconvenience from the stone, which still occasionally stopped the flow of urine.

Magnesia and Soda.—Magnesia and soda have been recommended together ; but as many stones are magnesian, the use of the former medicine may be improper.

Diluent.—Great dilution relieves the severity of the symptoms, and more especially mucilaginous drinks.

Stomachic Medicines.—Medicines which assist the digestive process are the most appropriate to prevent this disease, as it is often the result of taking food which is difficult of digestion ; or of a weakened state of the stomach, which renders common food indigestible.

Disease returns.—After removing a stone from the bladder, a medical treatment should be adopted, to prevent a return of the disease. The uric acid and oxalate of lime calculi return less frequently than the triple phosphate, which are very often reproduced.

Case.—I cut a Mr. Miles for the stone, and removed a triple phosphate calculus ; in about twelve months the disease returned, for I sounded him, and found a stone. Mr. Lyford, an excellent surgeon at Winchester, extracted this stone by the usual operation ; yet, on examination of this gentleman's body after death, which occurred several months subsequent to the second operation, several calculi were found in his bladder.

In another case, in which I extracted a triple phosphate calculus, from a patient of Mr. Van Oven's, in the city ; the disease returned, and I again performed the operation, and found a large coagulum of blood in the bladder, surrounded by a triple phosphate deposit.

LECTURE XXIII.

ON THE OPERATION OF LITHOTOMY.

Previous Inquiries.—BEFORE performing the operation for the stone, it is right to inquire carefully if the functions of the body are well performed in other respects : if the digestion be tolerably good, and the breathing and circulation be free. For if the liver be diseased ; if the chest be oppressed ; or if the heart have an irregular action, the patient does not in general recover from the operation. Pain in the loins, vomiting, or the discharge of matter, indicating disease of the kidneys, also form insuperable objections to the operation.

Case.—A patient came into Guy's Hospital to be cut for the stone : I sounded him and found a calculus, but he made water almost imme-

diately, and at the time discharged a considerable quantity of matter. I saw that he was emaciated ; he complained of pain in his loins, and his stomach was much disordered. I therefore said, "I will not operate upon this man, for he will die from the operation." In less than a month he died, and I was happy that I had not operated, as one kidney was found wasted, and the other at least twice its natural size, with its cavities full of a purulent secretion.

The success of one surgeon being greater than that of another chiefly depends upon his judgment in this respect, viz., not to operate when there is much functional or any organic disease.

The Age of the Patient.—The age of the patient does not much influence the result of the operation, with the exception I shall mention. Old age is not to be a bar to it, so far as the stone will permit, the patient be active, and has no other complaints. I generally, therefore, say to a patient, "If the stone were removed, would you be capable of taking exercise? is your digestion good? is your breathing free?"—If he answers, Yes, the operation may be performed.

Mr. Cline operated successfully upon a patient at 82 : Mr. Attenborough, of Nottingham, at a still more advanced age. I operated upon a gentleman aged 76, who had been near sixty years in the island of Jamaica : I performed the operation in 1812, and he died about ten days after, having returned to Jamaica and enjoyed his health there.

Sixty a favourable Age.—About sixty years of age is the period at which stone is most frequent in the adult, and then the operation is very successful. In the middle period of life, fever is more violent from the operation, and the patient is often too much loaded with adeps to be submitted to it. Fat persons do not generally bear operations well, they have little vital power ; they should be reduced by diet and medicine, and they must be accustomed to irritation of the bladder, by the frequent introduction of the sound ; but still they have more fever and disposition to peritoneal inflammation, than at a later period of life.

The most favourable Age.—The age at which there is least danger from the operation is from three to twenty, for death is then a very rare occurrence. Under the age of two years, children often become convulsed and die from the operation, on account of their excessive irritability.

Average Number of Deaths.—The number of deaths from the operation, taking all ages, is one to eight. Fat persons at all periods, but more especially in middle life, are those who most frequently die. A surgeon sometimes proceeds to twenty or even thirty cases with extraordinary success : but then he loses several patients, which still produces the average I have experienced.

Previous Preparations.—A short time prior to the operation, in addition to the exhibition of purgatives, &c., an enema should be administered, in order to empty the large intestines, and particularly the

rectum, which, if distended with fæculent matter, would be in great danger of being wounded.

OF THE OPERATION.

The Table.—The table, on which the patient is to be placed, should be two feet six inches high ; it is to be covered with two blankets and a sheet, and several pillows are required to support the patient's head and back.

Bandages.—Three bandages are required to secure the patient ; of these, two are employed to confine each hand and foot of the same side together : a loop, at one extremity, is first passed around the wrist, and the patient then grasps the outer side of the foot, about its middle, having the bandage passing from the wrist between the two ; the bandage is then passed under the foot, brought round on its inner side over the instep, and so round the wrist and ankle ; after two or three turns around these parts, it should be passed over the hand and under the foot, then to the wrist and ankle again, until the whole is used. The other bandage is to be placed round the back part of the neck, and each extremity being passed under the ham of the same side from within to without, they are to be carried back and tied behind the neck. These bandages prevent the patient from making any movements likely to impede the operation, or occasion danger during its performance.

Instruments, 1st. The Sound.—The instruments required are, 1st, a sound, consisting of a solid portion of steel, curved as the urethra, about twelve inches in length ; its thickness should be well proportioned to the size of the urethra.

State of the Bladder when sounding.—Persons often require to be sounded with their bladder full, and with it empty. I have frequently found a stone directly after the urine has been discharged, which I could not perceive when there was much urine in the bladder. It is right, therefore, to sound the patient first with his bladder full ; and, if the stone cannot be felt, then to have it emptied, and sound again. On this account, it is often useful to employ a silver catheter, at first preventing the escape of the urine, and afterwards allowing it to flow through the instrument, at the same time continuing to sound. When the bladder is empty, it frequently happens, however, that the instrument is so confined that it cannot be moved sufficiently to strike the stone.

Position of the Patient.—The patient should be sounded first in the recumbent position, and if the stone be not then felt, in the erect ; as the calculus, by falling upon the urethra in the latter posture, may be easily detected.

Stone not always detected.—I have myself sounded and not detected a stone at one time, which I have afterwards felt. I have sounded and not discovered a stone, which another surgeon has afterwards

perceived. I cut a patient, and extracted thirty-seven stones from his bladder, who had been sounded and declared not to have a stone.

Those who have not had experience in this disease, and have not frequently sounded patients afflicted with it, sometimes mistake the extremity of the sacrum, or the coccygis, for a stone.

The Staff.—The next instrument is the staff, which is somewhat similar to the sound, but rather more curved, and having a groove on its convex part; this groove should be as large as possible; 1st, because it is more easily cut into; 2dly, because the gorget or knife passes more readily by it into the bladder.

How to be held.—When performing the operation, the staff is to be held by an assistant, perpendicularly, or nearly so; and its extremity should, if possible, rest upon the stone; its groove is to be slightly inclined to the left side of the rapha of the perineum. Nothing can be more unsafe than to incline the handle of the instrument towards the patient's abdomen, as it draws its point out of the bladder into the urethra; and when the gorget or knife are passed on it towards the bladder, either is likely to slip between it and the rectum.

Position of the Patient during the Operation.—Before commencing the first incision, the surgeon should see that the patient be placed evenly upon the table, so that one side be not higher than the other; and also that the shoulders be sufficiently raised and well supported.

The Scalpel.—The knife, for commencing the incision in perineo, should have a considerable convex cutting edge, as by it the urethra is more freely opened. The scrotum being elevated, the incision is begun opposite the under part of the arch of the pubis, and is continued on the left side of the rapha, along the perineum, as far as mid-way between the tuberosity of the ischium and the anus.

The First Incision.—The first incision should divide the skin, &c., and expose the accelerator urinæ; the second should be carried between the left crus penis and the bulb; the latter being placed towards the right side by the forefinger of the surgeon's left hand.

A part of the accelerator urinæ is divided, and the transversus perinei should be freely cut, as it forms a great impediment to the extraction of the stone, if undivided.

Opening the Urethra.—The next incision should be made into the groove of the staff, by cutting into the membranous portion of the urethra; for this purpose the knife must be directed upwards, and not horizontally, otherwise the rectum is endangered: the opening made to expose the groove of the staff should be an inch in length.

A gorget, or a knife with a probed extremity, is next usually employed, to complete the opening into the bladder.

The Gorget.—The gorget may be considered as the divisor of the prostate gland, and it also serves as a director to the forceps. It was formerly used with a blunt edge, so that it acted as a wedge: when so formed and employed, the scalpel should be carried along the groove of the staff, so as to divide the prostate gland laterally, after the urethra

has been opened, which allows the blunt gorget to enter the bladder with comparative facility. The operation performed with this instrument is attended with very little bleeding, and has been very successful in its issue.

Cutting Gorget.—Hawkins had one of the edges of the blunt gorget made cutting. Mr. Cline made the greatest improvement upon the cutting gorget, in having the left side entirely removed, leaving only the beak and its right blade, which had a sharp anterior edge: this instrument enters with ease. It should be introduced horizontally, for there is considerable hæmorrhage if it be introduced obliquely, as it then opens a plexus of vessels surrounding the prostate, and which is continued to the vesiculæ seminales, and terminates in the internal iliac veins.

Hæmorrhage.—It is quite contrary to my experience to say, that persons do not die of hæmorrhage after this operation, for I have known many instances of it: four in particular, in which death was the immediate consequence of bleeding, suffered to continue for several hours; and several I have known die from gangrene of the scrotum occurring after severe hæmorrhage. The patient should never be left until the bleeding has ceased; and, if it be very considerable, the surgeon should place his finger within the wound and compress the bleeding vessel; but he should be careful not to quit his patient whilst any hæmorrhage remains.

It is best to use a small cutting gorget, as it lessens the danger of wounding blood-vessels; and then, if necessary, on account of the size of the stone, to dilate the wound, do it with the blunt gorget.

Mode of passing the Gorget.—The beak of the cutting gorget is passed into the groove of the staff, where it has been previously opened at the membranous part, and the instrument is then pushed along the groove into the bladder, so as to divide the left half of the prostate gland. It is necessary to press the beak against the groove as it glides along, and occasionally to move it slightly backwards and forwards, to be certain that no portion of membrane has got between the two: when the gorget enters the bladder, the urine flows out over its superior concave surface.

Size of the Gorget.—The length of the gorget should be proportioned to the size of the patient. The breadth of its cutting part, when used for an adult, should not exceed one inch; and the blunt gorget should be used, if the first opening be not sufficiently free.

The gorget which I at first used in my own operations was double, and cut upon both edges; but I thought it occasioned too much bleeding, and divided more than was absolutely necessary for the removal of the stone.

The Knife.—The knife is now frequently substituted for the gorget, and that which I for some time employed, in various cases, was straight and narrow, with a probed end.* After opening the membranous part

* Mr. Thos. Blizard, who was an excellent and successful operator, employed a knife of the same kind, excepting that the beak was at an angle with the blade, instead of straight.

of the urethra, as before, I passed this knife along the groove of the staff into the bladder. In the young this answers very well, and also in a thin adult; but in a deep perineum, or enlarged prostate gland, I prefer the gorget, as being more definitive in its cut.

The Forceps.—Forceps of various sizes are also required to lay hold of the stone, and those employed must depend on the bulk of the patient: the handles should occupy two-thirds, and the blades one-third of the length. I have tried many others of different proportions, but think that which I have mentioned the best. Some of the blades must be flat, for small stones, or fragments of stones; some should be curved, to remove calculi from behind the pubes or prostate: one pair should be large, as small forceps will not retain a large stone in their grasp, with sufficient firmness to extract it.

The forceps must be passed along the groove of the gorget with great care, and the gorget must be well retained during their passage. I have seen the forceps pass between the bladder and rectum, from the surgeon's pulling back the gorget as he thrust forwards the forceps, which should never be done. The gorget must not be removed until the surgeon has thrust his finger forwards to feel that the groove of the staff has been freely opened. I frequently, if the perineum be not very deep, remove the gorget after it has entered the bladder; and introduce the forceps by my finger, carried along the groove of the staff.

Mode of using the Forceps.—When the forceps have passed into the bladder, the gorget and staff are to be removed; and the surgeon, before opening the forceps, should sound with them for the stone. When the situation of the calculus has been thus ascertained, the blades of the forceps are to be separated and the stone received between them; and this must be done with great gentleness, not only to save the patient pain, but to prevent any injury to the internal surface of the bladder.

When the stone is drawn down to the opening in the perineum, wait a little for the cessation of muscular action from the perineal muscles, and introduce the finger by the side of the forceps, to feel if any obstruction exists, and to press it out of the way of the stone; for the finger is the best instrument for this purpose. It is right to turn one blade of the forceps to the pubes and the other to the rectum, as the stone cannot then injure the urethra. If the extraction of the stone be violently resisted, disengage and remove the forceps, then introduce the finger and feel how the stone is placed, and, if necessary, turn its long axis into the direction of the long axis of the bladder.

Having grasped the stone with the forceps, do not be hasty in extracting it, but be gentle in the employment of your power, depending upon the gradual rather than the sudden exertion of force. The great danger, and the most frequent cause of death, in my opinion, arises from the surgeon's employing excessive violence with the forceps. 1st, Bruising the bladder: 2dly, Disengaging it from its situation by tearing down its natural adhesions; it injures the peritoneum and brings on peritoneal inflammation: 3dly, It injures the prostate, sometimes tears the urethra at the membranous portion; and I have known the rectum

lacerated where it had not been injured by the incisions, which can only arise, in the use of the knife, from ignorance or negligence.

If the stone cannot be grasped with the straight forceps, a curved pair should be employed.

The operation for the stone consists, therefore, 1st, in opening the membranous part of the urethra, and dividing the transverse perineal muscles on the left side with the knife, and exposing the groove of the staff: 2dly, in dividing the left half of the prostate gland horizontally, and that portion of the bladder connected with it, by means of the gorget for probed knife: 3dly, in introducing the forceps, by which the stone is seized and extracted.

OF THE DIFFICULTIES AND DANGERS OF THE OPERATION FOR THE STONE.

Stricture in the Urethra.—If the urethra be the subject of stricture, do not perform the operation until it will admit a large staff. The strictures being removed, the operation is less difficult, and the recovery quicker and more certain.

Enlarged Prostate.—An enlarged prostate gland offers great difficulties to the operator, and if the stone be of large size, the patient will seldom recover, as the impediment to extraction is excessive, and the violence obliged to be used such as the patient can ill bear, at the period of life at which such disease of the prostate occurs. It is, therefore, in such cases, a very fortunate event when the stone breaks, as it is removed with less risk to the patient, although it renders the operation tedious.

Lateral enlargement.—A lateral enlargement of the prostate gland produces less difficulty, if it be freely divided, than the enlargement of the middle lobe; and this gland should be always examined per anum in aged persons, to prevent the surgeon being baffled by this disease, and if he finds it enlarged laterally, he must use a large gorget, or else divide freely with the knife.

Middle enlargement.—If it be an enlargement of the third lobe, the circumstance is known by the passage of the staff, which only enters the bladder by its handle being greatly depressed; also by the stone being felt distinctly at one time and not at another; and here let me observe, that when this happens in sounding, I have generally found some difficulty in the operation. The curved forceps are proper to be used in this form of disease.

Sac behind the Prostate.—The enlarged prostate gland often gives rise to another difficulty, by occasioning a sac to be formed immediately behind it, in which the stone is principally lodged, its extremity only projecting into the bladder, so as to be felt by the forceps; in this case the curved forceps are required, and the finger must be passed up the rectum, to raise the stone from this situation, and to bring it into the axis of the bladder.

Part of the Prostate nearly detached.—A portion of the prostate

isso metimes nearly separated in extracting the stone, so as to be afterwards pendulous into the bladder; this occasions symptoms somewhat similar to those of the stone to remain. This happened to Mr. Cline, who operated upon a gentleman very successfully as to the immediate result, but who, after his recovery from the operation, found all the symptoms of stone return. He lived a long time after, and before his death desired that his body might be opened. Mr. Ramsden inspected the parts, and sent me the bladder, which is now in the collection at St. Thomas's Hospital, and a portion of the prostate gland hangs by a narrow neck into the bladder; this portion, by falling on the urethra, produced the symptoms.

Enlargement of the Third Lobe.—From the enlargement of the third lobe of the prostate gland, little advantage is, on the same account, derived from the operation of lithotomy, as the patient still experiences all the symptoms of stone, excepting that the urine is not usually bloody; but even this circumstance I have known to happen.

Contraction of the Bladder.—I have seen a difficulty arise in performing this operation, from a partial contraction of the bladder, by which the stone has been firmly embraced so as to impede the use of the forceps. This arises from the sudden escape of the urine which the bladder contained previous to the operation. The fundus of the bladder, and half of the organ near to it, embrace the stone closely, the forceps are passed into the anterior part of the bladder and opened at its cervix; but, in attempting to seize the stone, only one of its extremities is nipped by the forceps, which slip from it immediately the surgeon tries to extract the calculus; this occurs several times, until the patient becomes exhausted, when the contraction of the bladder subsides, and then the stone is readily seized. In such a case, the flat forceps answer best, gliding most easily over the stone. If the patient does not retain his urine for a long period before the operation, this difficulty seldom occurs.

Narrow Pelvis.—In persons who have been the subject of rickets, the pelvis is sometimes so narrow as to render the performance of this operation excessively difficult. I once saw Mr. Cline operate in a case of this kind, and only his coolness and perseverance could have overcome the obstacles it presented. The subject was a child; the tuberosities of the ischia were very near each other, and when the forceps were introduced into the bladder, only the handles remained external to the wound; the extremity of the stone only could be caught hold of, and from this the forceps repeatedly slipped. Mr. C. finding that the longest pair of forceps, usually employed for children, would not reach beyond the centre of the stone, and that it could not be held by them, introduced a pair of forceps made for an adult, and with these he succeeded in grasping the stone, but the opening of the pelvis was too small to admit of its being extracted whole; he, however, after repeated efforts, broke the calculus with the forceps, and removed it by fragments. The child afterwards recovered.

Large Stone.—The stone is sometimes so large as to produce great

difficulty in the extraction. The largest which I have successfully removed has been between five and six ounces; but I remember to have seen one in the Norwich Hospital which weighed eight ounces, and was extracted without being broken. If broken, a very large stone may be successfully removed. Mr. Mayo, of Winchester, in this way, extracted one weighing altogether fifteen ounces. The largest which I have extracted whole was from Mr. —, of Fore Street, in the city, a relation of Mr. Field's, surgeon, in Wilderness Row; it weighed sixteen ounces; I was obliged to extend the incision in perineo to the sacro sciatic ligaments, and when I seized the stone with the largest forceps, I found I could not extract it; I therefore endeavoured to bore a hole in it with a gimblet, as I held it between the blades of the forceps, but scarcely made any impression upon it: at last I succeeded in removing it in the following manner: Mr. David Babington, son of Dr. Babington, then my apprentice (a most amiable and excellent young man, who entirely fell a victim to his professional zeal, and who, if he had lived, promised to be one of the highest ornaments of his profession,) assisted me. I placed a single blade, or crotchet, on the upper part of the stone, under the symphysis pubis, and then, whilst I pulled the stone with the forceps through the opening in perineo, Mr. B. pressed down the stone by elevating the handle of the crotchet, and thus brought it below the line of the symphysis pubis, and thus it was extracted. The time occupied by the operation was nearly an hour, and the patient survived only a few hours.

Forceps with Blades which separate.—For extracting very large calculi, a free incision is required, and the forceps must be large and strong. Mr. Cline had some made so that the blades could be introduced singly and joined together afterwards; or one blade could be used alone, as above described.

Instrument to break large Stones.—Forceps have been constructed with teeth, to break a large stone; and Mr. Earle has invented a perforator for the same purpose: such an instrument, easily applied, is in the highest degree desirable.

Soft Stones.—Soft stones create a difficulty in the operation, by rendering it necessary to remove the stone in fragments. It is thought to be very desirable afterwards to wash out the bladder by means of a syringe, with a view to prevent the future formation on any remaining portion. I believe it is better to use the scoop, and to remove with it all the particles of the stone which urine cannot carry off, as sand; for injecting the bladder will not remove fragments, and the after-flow of urine through the wound will remove sand.

Unnecessarily broken.—Stones are often broken which might be removed whole, if the surgeon were less violent, and more cautious. The mode of preventing them from breaking is, when the stone has been seized with the forceps, to put the thumb between the handles, so as to prevent them violently approximating, and to limit the degree of pressure.

Number of Stones.—A number of calculi render the operation more

tedious, but not so dangerous as one large stone. It is not the number of times that the forceps are introduced, but the violence used with them, which endangers the patient. When there are several in the bladder, care must be taken that none be left; and the surgeon must not be content with examining by the forceps only, but it is best to pass a sound into the bladder, either by the urethra or by the wound, to feel if any remain; he should also pass his finger into the rectum and raise the prostatic part of the bladder, so as to throw any stone lodged there into the axis of the bladder; as it often happens that the prostate gland is enlarged when several stones exist, and they are generally situated behind this enlargement.

Calculi not always detected.—In the instances of the greatest number of calculi which I have seen, it was doubted for a length of time if any existed; yet, in one case, the urine had been repeatedly drawn off, and in the other the patient had been several times sounded, but a stone could not be felt:—on examination, after the patient's death, fifty-six stones were found in the bladder.

Form of the Stone.—The form of the stone sometimes adds to the difficulty of its extraction; if its long axis much exceeds its breadth, when seized by the forceps in the centre it will not pass the opening in the bladder, from its extremities projecting on each side of the forceps; the surgeon, finding great resistance, should withdraw the forceps, and passing his finger into the bladder, he should turn the stone, and place its long axis from the fundus to the cervix, after which it can be easily extracted.

Sacculi enclosing Stones.—Sacculi in the bladder sometimes enclose stones so far, that only the end projects into its natural cavity, and can be alone felt by the forceps. In my own practice I have met with only one decided case of this kind, which was the following:

Case.—A boy was admitted into Guy's Hospital, in whose bladder, by sounding, I found a stone; but the symptoms were less urgent than usual, and each time I sounded the stone was felt in the same part of the bladder. This led me to examine per rectum, and I then perceived a stone lodged and fixed at the under part of the bladder over the rectum; I therefore made an incision between the bladder and the rectum in perineo, and, directed by my finger in the rectum, I reached the stone without wounding either the rectum or bladder; I then opened the sac with the knife, and seizing the stone with a pair of dressing forceps, I extracted it. The boy for three days only passed his urine by the wound, and then it took its natural course, and the wound healed rapidly.

Case.—In a case which I attended with Mr. James, surgeon, at Croydon, he found, on inspection of the body after death, two calculi, having large extremities connected by a narrow stem, one extremity of each was situated in a sac, and the other extremity in the cavity of the bladder.

As I have stated, a sacculus behind an enlarged prostate gland is a frequent occurrence, but the calculi are only occasionally falling into its cavity.

Corpulency.—Corpulency greatly increases the danger of the operation, as well as its difficulty. The perineum is often so deep as to render it impossible to reach the bladder with the finger, and, if the stone be large, the impediments to its extraction are greatly augmented, by the resistance afforded by the perineum.

Prolapsus Ani.—When a child has been long subject to prolapsus ani, it often becomes troublesome at the time of the operation. The anus should be supported by an assistant at the time the surgeon commences the operation, or it protrudes whilst he is making his incision. It may be observed, that in cases in which the prolapsus happens after opening the bladder, that if the instruments be withdrawn, they cannot again be introduced until the prolapsus be returned.

OF THE CAUSES OF DEATH FROM THE OPERATION.

The causes of death from lithotomy which I have witnessed are :

Nervous Irritability in Children.—1st, Nervous irritability occurring in very young persons : they are generally pale and almost comatose on the day after the operation : on the day following, their eyes roll quickly, and there is excessive restlessness ; they then become extremely weak, are convulsed, and expire. To relieve this irritable state, calomel and opium are the best remedies.

Peritoneal Inflammation.—2dly, Peritoneal inflammation, occurring when much violence has been used in extracting the stone.

The symptoms are ; vomiting, tenderness in the region of the bladder, tension of the abdomen, and difficulty in procuring motions.

The treatment consists in administering calomel purges, in applying fomentations, leeches, and blisters to the abdomen ; in bleeding from the arm, and the use of the warm bath.

In inspecting these cases, I have seen not only inflammation of the bladder and peritoneum, but extravasation of blood between the bladder, pubes, and abdominal muscles, showing that the bladder had been drawn down during the extraction of the stone. The removal of a large stone, when the prostate gland is enlarged, kills in the same manner.

Hæmorrhage.—3dly, Hæmorrhage. This I have seen repeatedly destroy life, and it has been with no small degree of surprise that I have heard it denied to be a cause of death.

Case.—I cut a man in Guy's Hospital at one o'clock in the day ; the operation was soon over, and apparently under the happiest auspices ; the patient was put to bed, and I soon after quitted the Hospital. In the afternoon the man became faint and vomited several times. At nine o'clock in the evening the sister of the ward, in turning down the bed-clothes, found the lower part of his body surrounded with blood, and the man was extremely faint. Mr. Callaway, my apprentice, was sent for, but the patient died in an hour.

A surgeon should not quit his patient until the bleeding caused by the operation has ceased : the patient should not be put to bed whilst

any hæmorrhage continues; and when in bed he should be very lightly covered for some time.

I find that bleeding more frequently occurs when the gorget is passed obliquely, in the direction of the external wound, than when it is passed horizontally.

Gangrene of the Scrotum.—4thly, Gangrene of the scrotum. This I have seen several times, in persons who have been of intemperate habits, or in those extremely weakened by age.

Extravasation of Urine.—5thly, Extravasation of urine into the scrotum, producing great inflammation and swelling, and leading to gangrene; it arises from the incision being made too high, so as to open the cellular tissue of the scrotum.

Scrotum to be supported.—After the operation of lithotomy, the scrotum should be always supported by a bandage, to prevent the urine which flows through the wound, from irritating it, and thus the disposition to gangrene is lessened.

Ulceration of the Bladder.—6thly, An ulcerated state of the bladder, shown by offensive urine, evacuation of mucus and of pus, mixed with blood, in some, are sufficient to lead to a fatal issue in lithotomy.

Diseased Kidney.—7thly, Diseased kidneys, whether inflamed, wasted, suppurating, ulcerated, or containing stones; marked by pain in the loins, by purulent discharge, and by a disordered stomach.

Visceral Disease.—8thly, Visceral disease, as a morbid state of the liver; dyspnœa from some chronic affection of the lungs; palpitation of the heart; irregular or intermitting pulse; which tend to destroy the powers of restoration.

OF THE AFTER-TREATMENT.

When the operation is concluded the patient is unbound; but the legs should not be immediately brought together if any bleeding continue, as the blood is apt to pass back into the bladder, where it coagulates; and producing great urgency to make water, the coagulum is forced out, occasioning a renewal of the hæmorrhage.

To be kept Dry.—No dressing is to be applied to the wound, but a folded sheet or napkin is to be placed under the nates of the patient in bed, and this should be frequently examined, to ascertain if the urine be secreted and pass away: it should be changed for a dry one whenever it becomes wet.

Opium.—Opium may be given, if the patient be very irritable; but as it is apt to check the action of the intestines it should not be administered unless absolutely necessary.

Diluent.—The patient should be allowed to take diluents freely at first; such as linseed tea, or barley water with gum acacia in it; and, when the danger of inflammation has passed, beef tea, broth, or gruel may be given.

Saline medicines, with excess of alkali, are useful ; if a tendency to fever or inflammation arises, purge the patient with castor oil, and foment the abdomen ; if it increase, give calomel and antimony, and occasionally castor oil ; if the pain in the abdomen become severe, bleed from the arm of the adult, and apply leeches to the abdomen of a child.

Tying the Legs together.—When the wound begins to granulate, and not before, tie the legs together ; as much mischief arises from doing so, soon after the operation ; 1st, in bleeding, as already mentioned ; 2dly, it prevents the free escape of the urine ; it is of no use until the wound be disposed to close.

Position.—It is not necessary that the patient should rest on his back only ; there is not any danger in his turning to the side, and great relief is often obtained by it.

Passage of the Urine.—The urine passes, in some cases, entirely by the urethra in the first few hours, but this is not desirable ; the patient suffers less in its discharge, and has less local irritation, if it escapes easily by the wound. In cases of enlarged prostate gland, it is proper to introduce a flexible catheter by the urethra, to permit the urine constantly to flow off. When the urine, under the common consequences of the operation, takes its natural course, the patient frequently suffers from a rigor.

Recovery.—Children usually recover from the operation in about three weeks, and adults in about a month ; sometimes both have the wound healed within a shorter period.

Evils following the Operation.—I have known two evils arise from the operation ; one, a loss of the power of the retention of urine, when the patient is obliged to wear a yoke, or jugum ; the other, an interruption to the passage of the semen, from some injury done to the veru montanum, where the united ducts of the vesiculæ seminales and vasa deferentia terminate.

Case.—A gentleman, I know, who has undergone this operation, has pain in coitu, but does not pass any semen, although he experiences the orgasm.

The patient's digestion and state of urine require to be attended to after the operation, to prevent a return of the disease.

Mr. Key, surgeon of Guy's Hospital, performs the operation of lithotomy in a different manner from that usually adopted. The points in which it differs from that commonly performed consist in the employment of a staff, nearly straight, and a scalpel-formed knife, which serves both for the external incision and for the division of the prostate gland, thus obviating the necessity for a change of instruments. The staff is slightly curved for about an inch from its extremity, to enable it to pass more easily over the prostate gland, and the knife is about twice the length of a common scalpel. The mode of performing the operation is as follows : the patient being secured, and the staff introduced into the bladder, an assistant is to hold the handle of the instrument inclined somewhat toward the operator, in order to

keep its extremity projecting some way into the base of the bladder. The staff having been fairly laid open by the usual free external incision, and the point of the knife being steadily pressed against the groove, the operator takes the handle of the staff in his left hand, and lowers it till he feels his hand checked by the ligament of the pubic arch. In this movement of the staff, the prostate is raised from the rectum, the ligament of the arch acting the part of a fulcrum, and the staff that of a lever, by which the gut is put out of danger of being wounded. The groove of the staff and the edge of the knife are then to be turned, by an easy simultaneous movement of both hands, in the direction most favourable for the free division of the prostate, which will be about an angle of 50° with the horizon. The knife is now to be carried gently along the groove through the prostate into the bladder, until the gland is completely divided, which the operator easily ascertains, by the resistance afforded to the knife ceasing.

In passing the knife, to complete the section of the prostate, its handle should be lowered to the bottom of the external incision, by which a sufficiently large angle is formed between the knife and staff, and thus an opening in the gland is made, large enough to admit the extraction of a moderate sized stone. When the stone is of unusual dimensions, or the prostate increased in size, it will be advisable to dilate the opening in withdrawing the knife, in the same manner as when the beaked knife is used; in common cases the knife may be withdrawn along the groove of the staff without the necessity of dilating.*

* As far as my own experience goes, I think the knife a much better instrument to divide the prostate with than the gorget; more violence is necessary to introduce the latter, and the opening made by it is limited to the width of the instrument: so that if a large stone be found much force is required to extract it, or the opening must be enlarged. With the knife, the surgeon may at once make a free incision through the prostate, which I consider a great advantage, as laceration or bruising of this part, by violence used in extracting the stone, is the most frequent cause of subsequent inflammation.

I have always made use of a long slender knife, with a probed extremity, of the same form as that mentioned by Sir Astley. During the early part of my apprenticeship to Sir A. C. he always used this instrument; and the success of his operations, performed with it, was greater than that which attended the employment of the gorget during the latter period of my time.

The probed extremity prevents the danger of wounding the posterior part of the bladder, supposing it to be in an empty and contracted state at the time the knife be introduced, which might happen with an instrument having a sharp extremity.

I have had an opportunity of using this knife in one case, in which great enlargement of the prostate existed; I did not find any difficulty in dividing the prostate; the operation was tedious on account of the stone being soft, so that I was obliged to extract it in pieces; but the patient, who was 73 years of age, perfectly recovered.

Out of nine other cases, in which I have used the probed knife, one only has terminated fatally: most of these persons were young and otherwise healthy.

The blade of the knife, which I used in the case of enlarged prostate, was longer than that usually employed.—T.

OF THE HIGH OPERATION, OR THAT ABOVE THE PUBES.

Not successful.—Attempts have been made to revive this operation, in this country and in France ; but in England, hitherto, they have been very unsuccessful.

Preferable under peculiar circumstances.—Those who have witnessed the general safety and facility in performing the lateral operation will never make use of the high operation, but under peculiar circumstances ; as when the prostate gland is very much enlarged, or when a stone of great size exists. My opinion is, that it should be confined to a combination of these two circumstances, viz., the large stone and large prostate, which render the operation in perineo very unsuccessful. Those who wish to be fully informed on this subject will consult the work of Mr. Carpue, who has taken great and very laudable pains to explain this operation.

OF REMOVING STONES FROM THE BLADDER BY THE URETHRO-VESICAL FORCEPS.*

Number of Calculi.—When a great number of calculi are found in the bladder, there is generally an enlargement of the prostate gland, and a sacculus formed in the bladder directly behind it. In these cases the bladder is rarely emptied completely of its fluid contents, and calculi form from the urine retained in the sac.

Usually small.—Such stones do not in general acquire the magnitude of those formed under the usual circumstances ; and from their number and friction against each other, their surfaces are generally smooth, and their shape rounded. Fifty-six such calculi were found in the bladder of Mr. Perkins, the brewer, who died from retention of urine.

Sometimes passed with the Urine.—Persons who labour under this form of the disease sometimes pass the smaller of the calculi whilst making water ; but the larger still remain, producing retention of urine, and the operation of lithotomy has often been performed for them ; but, as the following cases will prove, they may be extracted from the bladder by means which do not expose the patient to any loss of blood, do not occasion the slightest danger, or any very considerable degree of suffering.

I am fully aware of the impossibility of extracting large urinary calculi by the means which are here recommended ; yet I cannot but feel a hope that they may be removed, in the early stages of the disease, by the following means, before they acquire a bulk too large to pass by, the urethra.

* These observations and cases have been already published in the Medico-Chirurgical Transactions, vols. xi. and xii.

In the infant, also, it will be extremely difficult to contrive an instrument of sufficient delicacy to be introduced into the bladder through the urethra, which shall possess such a degree of strength as to enable it to grasp the stone firmly, and to extract it with safety.

Instrument for extracting small Stones.—The instrument which I first had made for the purpose of removing the calculi, was merely a common pair of forceps, made of the size of a sound, and similarly curved ; but Mr. Weiss, surgeons' instrument maker in the Strand, showed me a pair of bullet forceps, which he thought would, with a little alteration, better answer the purpose I had in view. He removed two of the blades of these forceps (for there were four), and gave them the form of the instrument which I had constructed ; the blades of this instrument could be opened whilst in the bladder, by means of a stilette, so as to grasp and confine the stone ; it gave but little pain on its introduction, but when opened to its greatest extent, and stones were admitted between its blades, their removal was painful, more particularly at the glans penis, which appears to be the portion of the urethra furnishing the greatest resistance to their removal.

I shall now proceed to detail the circumstances of the first case, as they have been related by the patient himself.

Case, as related by the Rev. Mr. Bullen.

The Rev. John Bullen, of Barnwell, near Cambridge, aged 64, of a spare habit of body and of a sanguine temperament, having enjoyed an uninterrupted state of good health, capable of partaking largely of the amusement of hunting, and living always with great moderation, was attacked, in May 1818, with symptoms, of which he gives the following account :

“ I was suddenly seized with a frequent inclination to pass my water, and an uneasy sensation along the course of the urethra, which continued with greater or less violence for about a fortnight, when I was surprised by the appearance of a small round white stone at the orifice of the passage. The escape of this small calculus, which was attended with scarcely any pain, failed to produce any beneficial effect on my former symptoms, which continued unabated, both as to the degree of irritation and the frequency of making water. In this state I remained till June following, during which month several similar calculi passed, to the number of about thirty, producing no other inconvenience than a slight smarting pain along the urethra. At the end of June, without any assignable cause, I was suddenly relieved from this discharge of calculous matter, and from every other symptom but that of a frequent desire to void my urine, which latter inconvenience occasioned me no feelings of anxiety or apprehension.

“ In the ensuing winter, I was seized with pains across the back and loins ; for which Mr. Brewster, of Cambridge, supposing they proceeded from gravel, ordered me medicines, which he considered likely to alleviate them, but without producing any permanent good effect.

"I was, however, still enabled to pursue my favourite amusement of hunting, though frequently obliged to dismount to make water ; at this time making no alteration from my accustomed mode of living.

"Without any material change I remained until the December of 1819, when I found the exercise of riding was becoming considerably more painful, and the inclination to pass my water more frequent, attended with some degree of difficulty in its passage, and a change, from its usual colour and clearness, to a fluid resembling chocolate. For these symptoms several formulæ of medicines having been prescribed without any material benefit, I was induced to consult Mr. Abbott, a most respectable surgeon at Cambridge, who ordered me medicines highly beneficial in their first effects ; the relief, however, they afforded me, was but of short duration, for my symptoms recurred with all their former violence ; and though the prescriptions were repeatedly altered at Mr. Abbott's suggestion, no sensible impression could, by the most judicious treatment, be made on the disease.

"My friend, Dr. Thackeray, of Cambridge, was, in the June following, called in consultation with Mr. Abbott ; and both agreeing that the symptoms were produced by stone in the bladder, the sound was introduced to ascertain its presence, but failed to discover it. My symptoms continuing unabated, Mr. Abbott, a fortnight afterwards, still impressed with the idea of stone, again sounded me ; but the stones, for the reasons hereafter given, escaped detection. To relieve my frequent inclination to make water, and to mitigate the pain I experienced in its discharge, I was recommended the use of an opiate glyster at bed-time, which afforded me considerable relief ; but if the injection were omitted but for a single night, the symptoms returned with all their former violence.

"In this state of suffering I determined to consult Mr. Astley Cooper, and on the 17th of August went to town for that purpose. Mr. Cooper, suspecting from my account that a stone was present in the bladder, sounded me ; but after searching for some minutes was unable to detect one ; he then directed me to discharge the water from my bladder, and the sound being again introduced was distinctly heard to strike upon a stone. He then informed me that there was no hope of permanent relief but from the operation of lithotomy ; at the same time remarking that, as I had not been sufficiently reduced by the irritation of the disease to render me a favourable subject for the operation, it would be better for me to return to Cambridge, and by pursuing a certain plan of diet and regimen, to reduce the high health which I appeared to possess. He also prescribed alkaline medicine, for the purpose of lessening irritation. With this advice I returned home, where I remained till October, 1820, pursuing the use of the soda and the opiate injection. My sufferings being alleviated only for the moment, and seeing no probability of experiencing further relief from medicine ; on the 23d of October I came to London to submit myself to the operation, and the 30th was the day proposed for its performance.

"On the day appointed, Mr. Cooper, his nephew Mr. B. Cooper,

and Mr. Merriman, junr., attended at my house. Upon sounding me, the instrument could be distinctly heard, by every person present and even by myself, to strike against a stone. Mr. Cooper, however, was of opinion that the stone was so small, as to admit of extraction without cutting into the bladder; and, therefore, determined not to perform the operation, but told me that he would try less dangerous means to rid me of this complaint; and happily under these circumstances the operation was deferred.

"On the 3d of November, I called at Mr. Cooper's house, when he passed a full sized bougie into the bladder, for the purpose as he said, of dilating the urethra, and thus giving the stone an opportunity of passing with the flow of urine. This operation was repeated on the 6th, 10th, and 13th of November; but on the 14th an inflammation took place in the prostate gland, from the introduction of the bougies, and put a stop to the prosecution of this plan of treatment. The effect of this inflammation was a retention of urine, rendering it necessary for Mr. Cooper to draw off my water every twenty-four hours; at which time the calculus could always be distinctly felt by the catheter. After the inflammation had subsided, the power of making water not having returned, Mr. Cooper passed an elastic catheter into my bladder, and directed me to wear it; teaching me, at the same time, how to withdraw it when it became either painful or obstructed; and, on several occasions, I discovered small white stones in the opening of the instrument similar to those which had passed in 1818. Mr. Cooper, upon being acquainted with this circumstance, expressed a wish to remove the instrument himself; when, upon withdrawing it, a stone was seen large enough to fill the opening in the side of the elastic catheter. The passage of these calculi suggested to Mr. Cooper the possibility of inventing an instrument by which he might remove those that remained in the bladder; and on the 23d of November he brought with him some instruments contrived for the purpose; one of which he directly employed, and was so fortunate in the first trial as to remove eight calculi of small size. The operation was productive of a very inconsiderable degree of pain.

"On the 28th, eight more were removed by the same means, of a larger size than the former, two being as big as horse-beans. This operation was attended with even less pain than the former.

"On the 30th, eleven were extracted; three or four being engaged each time the instrument was withdrawn. The removal of these gave me great relief, for I was immediately enabled to pass a considerable quantity of urine by my natural efforts; and previously to this, ever since the large bougie had been introduced, I had been unable to pass my water without the aid of the catheter.

"On the 8th of December six stones were removed by the same means.

"On the 13th, nine more were taken away.

"On the 19th, three more were extracted.

"On the 23d, twelve more were removed; thus only allowing the

intermission of a day or two for the irritation to go off. The operations were repeated until eighty-four calculi were, by these means, extracted from my bladder ; when Mr. Cooper pronounced, after a most careful examination, they were all removed. My health has been all this time uninterruptedly good, with the exception of the attack of retention of urine from the use of the large bougie ; and I am now able to discharge my urine without the use of the catheter, and to walk nearly as well as I ever did."

The following case is, in part, detailed from the patient's account of his symptoms ; and, in part, from the statement of Sir Gilbert Blane, who is the patient's physician.

Sir William Bellingham's Account of his Case.

"Sir William B—— is in his 67th year ; he suffered much at times from long and severe attacks of gout, from about his 35th to his 60th year ; since which period the attacks have been much less frequent, much mitigated, and of short continuance. He thinks he first perceived red gravel or sand to come from him occasionally, soon after a long fit of the gout about seven or eight years since, but did not suffer much inconvenience from it. About four years since, he passed pieces of gravel at different times, and has continued occasionally to do so ever since ; sometimes larger than a pea, but generally of an oblong shape. When they occasioned any stoppage in the passage, he used a hot bath at 94°, and drank plentifully of some diluting drink, which, after a little time, relieved him. In the summer of the year 1820, having had occasion to use a great deal of walking exercise in London ; for three or four days he was much surprised on passing, first, a considerable quantity of very dark stuff, nearly like coffee grounds ; and afterwards a considerable quantity of, what appeared chiefly, blood. He did not experience any pain of consequence with this ; and by the following day his urine was as clear as before. Upon going into the country, he found that if he rode fast at any time, it brought on the passing of the dark stuff, and afterwards, if persisted in, of blood. By degrees he gave up riding, and finally ceased to ride about Christmas last ; and finding the same effects to arise in a slighter degree from walking much, he has very nearly given up that also, for the last six months. Sir Astley Cooper and Sir Gilbert Blane attended him for these symptoms, in June and July 1821, when he left London for Ireland : whilst there, he continued to experience the same inconvenience as before, with but little pain, and the same on his return to London. Early in June last, he called on Sir Astley Cooper to say he was going again to Ireland, and wished to have some conversation with him, when Sir Astley Cooper advised his being sounded ; which he then was, and it was ascertained that there was a stone. As it appeared, to Sir Astley Cooper, to be a small one, he proposed trying to extract it, and on the fourth trial, with intervals of a week or so between them, a stone weighing seventeen grains and a half was extracted on the 18th

of July. About three weeks after, Sir William, having some fears that there still remained some stone behind, again applied to Sir Astley Cooper, who upon sounding found that such was the case ; and on making at that time at his house an attempt to extract, he brought it part of the way, but found it too large to bring forward, and therefore returned it ; and, as soon after as the parts would permit, he commenced enlarging the passage by bougies, which he continued at intervals for nearly a fortnight, and then extracted a stone weighing fifty-four grains, on the 28th of August, 1822."

Sir William B. suffered pain in making water ; swelling of the corpus spongiosum at the scrotum, with considerable urethral discharge, until September 23d, when the symptoms subsided, under the application of fomentations and poultices.

When the size of the stone is observed, it will not excite surprise that I had considerable difficulty in extracting the larger, which weighed fifty-four grains. It was in that part of the urethra near the glans that the chief impediment was found ; and, if I had thought proper to do so, I could have easily removed it from thence by incision, but I preferred completing the extraction without occasioning a wound. Yet I am now disposed to believe, that in a stone of equal magnitude, it would be better to make a small incision into the urethra, anteriorly to the scrotum, than employ force for the extraction of the stone through this narrow part of the urethra.—A. C.

Mr. King's Case.

Mr. William King, aged 66, mariner, residing at Rochester, was sent to me by Mr. Newsom, surgeon, of Rochester, on account of his having symptoms of the stone.

He came to London on the 29th of October, 1822, and on the 30th he visited me. I sounded him, and found that he had, as Mr. Newsom supposed, calculi in the bladder. I passed the urethral forceps into the bladder, and in a few minutes extracted four calculi ; and although I could still perceive that some remained in the bladder, I did not choose to risk the production of any considerable degree of irritation ; but advised him to come on November 1st, to have the operation repeated.

On the 1st of November I extracted three calculi ; on the 4th, five more ; on the 7th, twelve calculi ; on the 11th, two ; and on the 13th, three more. I then examined the bladder with care, but could not perceive any more stones ; and, even before the removal of the last, he had experienced considerable diminution of the pain in making water, and of the difficulty in passing it.

It is delightful to hear the expressions of gratitude which this patient pours forth for the relief which he has experienced from these operations, under which he has suffered but a slight degree of pain, and has never for a moment been confined from whatever exercise he was disposed to take.

Some years ago he passed red sand (uric acid) ; but for several months before he had symptoms of the stone, he had not perceived any.

Case.—I have lately removed from a young person (a patient of Mr. Rutherford, in Ratcliffe Highway,) of the name of Errington, a calculus of moderate size, and enabled two others to pass, by withdrawing the instrument in its dilated state, and thus extended the urethra, in such a degree, that the stones passed in the afternoon of the same day in a copious discharge of the urine.

I have heard that it has been stated, that there was no novelty either in this idea or in the instrument. To this I have only to observe, that if the idea had previously occurred to any individual, he had so far buried it in his bosom that I had never heard of it ; and, as to the instrument, I am quite sure that Mr. Weiss consulted no musty volume for its formation ; for, so soon as I mentioned my wish, that he should construct a pair of forceps by dividing a sound in its middle, and giving it a joint two inches from its end, he, without quitting me, observed that he should make them to open, in the mode in which he now makes them. Mr. Weiss has a strong and ingenious mind, and does not use petty artifices to obtain employment or character. But let us for a moment suppose (what I do not believe) that the idea had occurred to others, and the instrument had been made centuries ago, what are we to say of the apathy of those bright ornaments of their profession, Cheselden, Pott, Hunter, Cline, Home, Blizard, &c., who, if they had heard of such an instrument, had never employed it ?

OF BREAKING OR SAWING STONES IN THE BLADDER.

An instrument for the purpose of breaking stones in the bladder (called lithontripteur) has been invented ; and, during the last year, successfully employed in Paris, by Mons. Civiale.

A description of the instrument, of the mode of using it, and an account of three cases in which it has succeeded, have been published from a Report of the Royal Academy of Sciences.

The size and straight form of the lithontripteur render it only applicable to peculiar cases. The urethra must have acquired its full growth, and the prostate gland must be in a healthy state, or the instrument cannot be employed with safety : even then the urethra must, in most cases, be gradually dilated by the passage of bougies, before the operation can be performed. When introduced into the bladder, the lithontripteur is not calculated to seize a large stone, as the claws or holders do not separate to a sufficient width to grasp it, which cannot be remedied unless the size of the instrument be increased, or the springs weakened.

The lithontripteur is therefore only adapted to the case of an adult, having a sound state of urethra and prostate, provided the calculus be also of a moderate size.

This instrument has not as yet been successfully employed in this country.

Mr. Weiss, whose name I have already had occasion to mention, has made an instrument, which is well calculated to break stones of small size, and of not very hard consistence ; it is on the same plan as the urethro-vesical forceps, but having strong springs. He is now engaged in perfecting an instrument, which will divide a stone into minute pieces by means of a saw.

OF CALCULI IN THE URETHRA.

They may be best described in the three situations in which the surgeon is called upon to aid their passage, or to remove them by operation ; viz., 1st, in the membranous part of the urethra ; 2dly, above the scrotum ; 3dly, opposite the frænum.

In the membranous part.—If you are consulted on account of a stone being arrested in its progress at the membranous portion of the canal, you find the patient having the strongest desire to void his urine ; but able only to pass a few drops, with dreadful agony. You introduce a catheter into the membranous part of the urethra, and, feeling a stone grate against its extremity, you should immediately withdraw it, and pass a bougie as large as the passage will admit ; when this touches the stone it should be left in, and the patient should be directed to sit in water as hot as he can bear it, and continue it as long as he can ; at the same time he should take opium with small doses of tartarized antimony. In half an hour, or an hour, withdraw the bougie, whilst the patient tries to make water, when the stone will frequently follow the bougie, being forced from him by the *vis-a-tergo*. I have found this plan to be the most successful.

Operation to extract the Calculus.—If the stone permanently lodges in the membranous portion of the urethra, pass a catheter down to it, and introduce a finger into the rectum, to press upon the canal behind the stone, so as to prevent any retrograde movement of it towards the bladder ; then make an incision in perineo upon the calculus, and extract it with the common dressing forceps.

Stone behind the Scrotum.—If the stone be placed in the urethra above the scrotum, try to press it forwards with the fingers, until it be brought before the scrotum ; if this cannot be effected, it must be pushed back behind the scrotum, and there cut upon, if the use of the large bougie, as in the former case, is not successful.

Scrotum must not be opened.—Do not cut through the scrotum to remove a calculus until all other means have been tried ; and if it be at all necessary, which I doubt, let the external opening be free, so as to allow of a ready escape for the urine, and thereby prevent its extravasation into the cellular tissue, which would produce extensive inflammation and suppuration. A catheter should be introduced into the bladder after the operation, and left there, that the urine may flow through it during the time the wound is healing.

Stone near the Glans.—If the stone be situated near the glans, the surgeon should try to press it through the meatus ; but, if he cannot accomplish this, he should introduce a common probe, curved at its end, behind the stone, and draw it forwards.

Forceps cannot be introduced effectually, because they open in the urethra before the stone, but cannot be passed over it.

Meatus to be enlarged.—It is better to enlarge the meatus with a lancet, to free the passage of the stone, rather than risk the laceration of the parts from violence.

Preparations in the Museum at St. Thomas's Hospital.—In the collection at St. Thomas's Hospital I have two preparations, showing calculi which have ulcerated their way into the urethra. One, a stone of the form and size of the little finger, and slightly curved, which I cut from a young man who had a fistula in perineo : with a probe I felt the end of a calculus through the fistulous opening, and therefore made an incision and extracted it ; its anterior extremity was in the membranous portion of the urethra, its posterior in the bladder. In the other preparation, the stones are seen partly in the prostatic part of the urethra, passing there by ulceration. I have twice known a stone in the urethra destroy life by occasioning an extravasation of urine into the scrotum.

LECTURE XXIV.

OF CALCULI IN THE PROSTATE GLAND.

I SEPARATE these from urinary calculi, because they are formed independent of that secretion, and they differ generally in their component materials from urinary calculi.

Found in two Situations.—I have found them in two situations in the prostate : 1st, several calculi, each seated in a separate small duct ; 2dly, numerous calculi placed together in a cyst or bag in the substance of the gland.

Do not acquire a large Size.—They rarely acquire any considerable size ; the largest I have seen not being bigger than a pea, and they seldom are so large ; but their numbers are sometimes very considerable.

Case.—I was called by Mr. George Vaux, to see a Mr. Lewis, in the Old Jewry, who had retention of urine, and in whom there was difficulty in passing the catheter. As the instrument entered the bladder through the prostate gland, it grated over a stone. I passed my finger per rectum, and felt two or three calculi grating against each other, and I endeavoured to persuade him to let me extract them,

but he would not consent. He died of diseased kidneys, and I have his prostate gland, containing the calculi, in the collection at St. Thomas's Hospital.

Case.—The second case was that of General B—, whom I cut for the stone in his bladder: I removed many calculi, some of which were prostatic and some urinary. The surgeon, who had attended the General previously, had observed that a bougie, which he had introduced into the bladder, was marked by the calculi. The patient recovered.

Case.—I operated on a patient of Mr. Forbes, surgeon at Camberwell, and removed an immense number of prostatic calculi. These calculi had produced not only painful feelings in the perineum, but a degree of irritation, which kept the patient in continued mental excitement, bordering upon insanity. I introduced a staff into the bladder through the urethra, and opened the perineum as far as the prostate, cutting into the urethra, as in the operation for lithotomy; I then made an incision into the left lateral lobe, and extracted many calculi from a bag formed in it. The patient bore the operation well, but did not perfectly recover; a fistulous opening remained, and his symptoms became as distressing as before. On examining by the fistulous opening, I could distinctly feel more calculi, although I could not discover them by introducing my finger per rectum. The sufferings of the patient induced me, about six months after the first operation, to perform a second, which I accomplished by passing a director into the fistulous opening, and then enlarging this opening by a bistoury: I extracted about half as many calculi as in the first operation. The patient soon recovered from the effects of this second operation, and the wound closed entirely; but, after a short time, his sufferings became as dreadful as before, and, believing that he could not procure any relief, he destroyed himself six months after the second operation.

The operation is not difficult, and is certainly not dangerous. If the calculi are in a single cyst, a single operation will produce complete relief; but if more than one cavity exist, other operations will be required.

These calculi are composed of phosphate of lime.

OF CALCULUS IN THE FEMALE.

Operation seldom necessary.—Lithotomy is much less frequently required in the female than in the male, probably on account of the meatus readily permitting the escape of materials which would have become the nuclei of stones in the male, be they portions of gravel, of blood, inspissated mucus, or extraneous bodies.

Symptoms.—When the female labours under calculus, her sufferings are more severe even than those which the male experiences from this disease: at first the symptoms are of the same kind, as urgency to make water, and frequent inclination to do so; sudden stoppage to

the flow of the urine; pain at the end of the urinary passage; and blood occasionally mixed with the urine. In addition to these symptoms, as the irritability of the bladder increases, the pain during micturition is excessive, and there is agonizing suffering after the discharge of the urine, from a bearing down of the bladder, uterus, and rectum, with a sensation of their being forced through the lower opening of the pelvis. The retention of urine becomes imperfect, and the person is always wet, and smells offensively of urine. The sufferings of the patient at length render her incapable of moving from her bed.

The calculus is usually lodged in the bladder, as in the male; but I have once seen a case in which the stone was placed half in the urethra and half in the vagina; the extremities of the stone were large, and connected by a narrow portion, which passed through an ulcerated opening in the under part of the urethra.

Unnatural Propensities in Women.—Women sometimes render themselves the subjects of lithotomy from perverse and unnatural propensities. I have known a female put a pebble into the meatus urinarius.

A lady in using a catheter for herself, broke it in the bladder, and I extracted it in the presence of Mr. Ilott, of Bromley.

I have known women introduce extraneous substances into the vagina, to invite the operation for the stone.

Case.—A girl, about twenty years of age, came to St. Thomas's Hospital, describing herself to suffer all the symptoms of the stone; she was placed upon the operating table, before all the students, and Mr. Cline passed a sound to ascertain the presence of the stone; he struck some solid body, and a person of less caution might have immediately proceeded with the operation; but he said, "I feel a solid body, which has not the hardness of stone; he then examined by the vagina, and drew from thence a portion of coal, and afterwards several other pieces: she had no disease.

Case.—I cut a woman in Guy's Hospital for the stone, and found a large piece of brass-nail in her bladder, which is now in the collection at St. Thomas's Hospital.

Stone formed on an Extraneous Body.—In the female, a stone will form around an extraneous body, as in the male, of which the following is a curious instance:—a woman was the subject of retention of urine, and required the frequent introduction of the catheter: she was under the care of Mr. Castle, surgeon at Sittingbourne; and one of his assistants having passed the catheter, allowed it to escape from his fingers into the bladder, and there it remained for several months: she was then sent to Guy's Hospital, where I sounded her and felt the catheter. I opened the urethra freely with a knife, and passing my finger into the bladder, found the catheter placed transversely in it, and on its centre a large calculus with each end free from such accumulation. I then brought down one end of the catheter to the meatus, with my finger, and thus removed it. The calculus deposit on the instrument weighed at least an ounce.

Large Stones may pass the Urethra.—Very large calculi can pass by the meatus. Mr. Giraud gave one of more than an ounce weight, which a woman had passed with her urine.

Medical Treatment.—The same medical treatment is proper in the female as has been recommended in the male, to lessen the patient's sufferings. It might be thought that solvents could with advantage be injected, but the patients cannot bear them, and will not submit to their use, as they irritate excessively. Opium may be injected, or a suppository be introduced; but they only relieve for a very short period.

Calculi extracted without cutting.—Stones of large size may be extracted from the female without the use of cutting instruments. Mr. Thomas has related, in the *Medico-Chirurgical Transactions*, a case in which he dilated the meatus urinarius to extract an extraneous body from the bladder. Guided by this circumstance, I removed a calculus, having, by the use of sponge tent, dilated the meatus; and in another case, by the dilating forceps, I took away a portion of a catheter.

Case.—Dr. Nuttall and myself attending a case together, he objected to my mode of dilating the meatus, and thought that forceps with blades opening in parallel instead of divergent lines would be better. We walked together to Mr. Weiss, who, with his usual ingenuity, made a forceps upon that principle.

Unless a stone be extremely large, it should be removed by dilatation of the urethra, which may, by a speculum or pair of forceps, be opened sufficiently in a few minutes for this purpose. The advantage attending this mode of extracting a stone is, that the passage again contracts, and the urine is afterwards retained.

In the first case in which I performed this operation in Guy's Hospital, having used sponge tent, the patient perfectly recovered in a very few days.

Mode of operating with the Knife.—If the operation for lithotomy be required in the female, it should be performed in the following manner:—the patient having been bound in the same position as in the operation on the male; the sound is to be introduced (and it may be sometimes necessary to use a curved male sound, which Mr. Cline used to recommend,) in order to detect the calculus.

The stone being found, a straight staff is to be introduced when the sound has been withdrawn; and this the surgeon should hold in his left hand, with the groove turned to the left branch of the ischium: the beak of the straight bistoury is then to be passed along its groove into the bladder, so as to divide the meatus and urethra obliquely downwards and outwards on the left side, between the vagina and branch of the ischium. The finger may then be passed into the bladder, to ascertain the situation of the stone, after which the forceps are to be introduced and the stone extracted. The curved forceps are sometimes necessary on account of the capacity of the bladder, and the usual position of the calculus, which rests behind the neck of the bladder, over the posterior and upper part of the vagina.

Large Stones difficult to extract.—A large stone is with difficulty

extracted from the female, on account of the proximity of the meatus and pubes.

Operation causes Incontinence.—In all cases of this operation which I have performed or witnessed, the urine has not been afterwards retained ; but I would not deny that a patient might recover the retentive power.

As the loss of retention is a greater evil than I can describe, producing excoriation, and a very offensive state, I shall, in any future operation of lithotomy, try what may be effected by employing a suture to bring the divided parts together.

OF CALCULI IN THE SUBMAXILLARY DUCT.

Produce Inconvenience.—Stones forming in this duct produce considerable inconvenience, and the cause of the symptoms generally exist for some time before it is discovered.

Case.—When I was living with Mr. Cline, he used frequently to say, “I have a spasm in my mylohyoideus muscle,” and it was usually at the time of eating that he made this observation : at length he said, “I have discovered the cause of the uneasiness and spasm under my tongue, it arises from a stone in the submaxillary duct,” which he desired me to feel, and which I removed from him in the manner I shall presently describe.

Case.—A medical man called upon me and said, “I have an irritation and swelling under my tongue ; I have taken great quantities of blue pill ; but as my health is becoming impaired, and the disease continues, I am advised to go to the coast.” On putting my finger under his tongue, I felt a calculus, which I immediately removed, and in a week he was well.

Situation.—These calculi are generally situated in the trunk of the duct, but sometimes in its branches within the substance of the gland.

Size.—The largest I have seen was the size of an almond deprived of its shell ; I have seen one fluted so as to allow of the passage of the saliva through the depression.

Composition.—They are composed of phosphate of lime.

Operation to extract them.—The operation for their removal is to be performed as follows:—the cheek is drawn back by means of a blunt hook introduced at the angle of the mouth ; the duct is pressed upwards by the finger of an assistant, placed under the lower jaw : an incision is then made, with a pointed and curved bistoury, upon the stone from under the tongue, within the mouth, so as to divide the lining membrane of the mouth and open the submaxillary duct ; the stone being exposed is to be brought from its situation by means of a small hook which is to be passed under it. If the stone be deep seated in the substance of the gland, a small pair of forceps are required to extract it.

LECTURE XXV.

OPERATIONS FOR RETENTION OF URINE.

It is not my intention, in the present Lecture, to enter into a detailed description of the causes which give rise to the retention of urine; but merely here to state them generally, and at a future time give a more particular account of each.

Causes.—The causes which I have known produce retention of urine in the male are:

1. A narrow orifice to the urethra.
2. A congenital obstruction in the urethra.
3. Permanent stricture.
4. Inflammatory stricture.
5. Spasmodic stricture.
6. Abscess or tumour pressing upon the urethra.
7. Stone in the urethra.
8. An enlargement of the prostate gland.
9. Paralysis of the bladder.
10. Chancres or other ulcers in the urethra, which in healing close it.

In the female:

1. Polypus of the vagina.
2. Polypus of the uterus.
3. Ovarian enlargement.
4. Retroversion of the uterus.
5. Loss of power from uterine affection, a species of hysteria.

Consequences.—From whatever cause the retention be produced, the bladder must be relieved of its load, or the patient will die from inflammation or gangrene, or perish from irritation.

An Operation necessary.—If therefore a catheter cannot be introduced; if relaxation by bleeding, the warm bath, and antimony; if lulling the patient by opium, do not succeed in giving a passage to the water, an operation will be required to save the patient.

Symptoms.—Besides the dreadful pain and excessive irritation occasioned by the distention of the bladder, retention of urine is marked by a frequent urgency to make water, and swelling of the lower part of the abdomen, from the accumulation in the bladder; this swelling reaches as high as the navel, and on each side to the lineæ semilunares: the fluid accumulation can be distinctly felt through the abdominal parietes.

Operation.—The mode of relief which has been usually resorted to has been to puncture the bladder; but, in the male, it is not the opera-

tion which I perform, nor do I recommend it as a general practice ; but as it may be occasionally required, I shall describe the different modes of puncture.

Founded on Anatomical Knowledge.—The operations of puncturing the bladder are founded upon a knowledge of the reflexion of the peritoneum, which passes from the abdominal parietes above the pubes to the fundus of the bladder ; and is continued to the back of the bladder, near to the prostate gland, and is then reflected to the fore part of the rectum.

Thus the cervix of the bladder and its fore part above and behind the pubes, also the posterior and inferior part behind the prostate gland as far as the entrance of the ureters, are devoid of peritoneal covering.

OF THE PUNCTURE ABOVE THE PUBES.

When the bladder becomes excessively distended, its fundus rises towards the umbilicus, and carries with it the peritoneum, so that a considerable space is left above the pubes uncovered by this membrane, at which place a trocar may be easily introduced, without danger of wounding it.

This space is covered by the linea alba, in the centre, and at the sides by the pyramidales and recti-muscles, the bladder being attached beneath by cellular tissue.

Operation.—The operation requires the following attentions:

1st, The patient is to be placed on a table, in the horizontal position, with his knees a little elevated.

2dly, The hair is to be removed from the pubes.

3dly, An incision, one inch in length, is to be made through the integument immediately above the pubes, in the direction of the linea alba.

4thly, A trocar and canula, of sufficient length, are passed through the opening in the skin, and then thrust through the linea alba, cellular tissue, and fore part of the bladder into its cavity.

5thly, The direction of the trocar should be to the basis of the sacrum, that is, a little upwards, and not directly downwards in a perpendicular line, as it may then pass between the bladder and pubes ; and even if the instrument enters the bladder, as the organ contracts it slips from the canula.

6thly, The trocar is to be withdrawn to allow the urine to escape through the canula.

7thly, A male flexible catheter is to be passed through the canula, cut to a proper length, so as to remain in the bladder, and it is to be secured so as to prevent its escape.

This operation is easy of performance, requiring little anatomical knowledge, and has therefore usually had the preference given to it.

After-treatment.—When the inflammation following the operation

has subsided, when all danger from extravasation of urine into the cellular membrane has ceased, and the patient recovers his health, it is right to begin attempts to re-establish the urethra by the use of bougies, sounds, &c. ; and this may be generally effected.

Case.—I saw a man from Essex, below Malden, whose bladder had been successfully punctured by Dr. Hare, above the pubes, twelve months before, and who came to town to consult me, with a female catheter still remaining in the bladder, in the same opening at which the urine had been drawn off. I, after a time, succeeded in passing a catheter into his bladder through the urethra, the female catheter was removed, and he returned into the country with the wound above the pubes quite closed.

Objection to the Operation.—An objection to this operation, formerly urged, was, that the canula remaining in the bladder produced irritation ; this is obviated by the use of an elastic gum catheter, instead of the metallic one.

OF PUNCTURING THE BLADDER BY THE RECTUM.

Bladder forms a Projection into the Rectum.—When the bladder is greatly distended, and has not undergone any morbid change, it generally projects into the rectum ; so that if the finger be introduced into the gut, a fluctuating swelling is felt just beyond the seat of the prostate gland.

When the prostate gland is enlarged, this part of the bladder is more remote from the anus and less accessible, although still within reach.

Part to be Punctured.—Behind the prostate gland is a triangular space, bounded in the following manner :—on each side by the vasa deferentia and vesiculæ seminales meeting at the prostate ; and the peritoneum is the boundary behind. In the centre of this space a trocar and canula may be passed through the fore part of the rectum, through the cellular tissue connecting it to the bladder, and through the coats of the latter into its cavity.

If the centre of the space be kept, there is no danger of wounding the vasa deferentia or vesiculæ seminales if the bladder be distended. The trocar may be safely introduced an inch behind the prostate without risk of injuring the peritoneum, and the vasa deferentia may be thus completely avoided, whereas a puncture near the gland might endanger them.

Operation.—The operation is to be thus performed.

1st, The patient is to be placed on a high table, so that the surgeon can sit lower than the patient.

2dly, The finger is to be passed per rectum to the projecting portion of the bladder behind the prostate.

3dly, A trocar and canula, three inches long, are to be passed upon the finger to the protruding part of the bladder, and forced through the fore part of the rectum and posterior part of the bladder into its cavity.

A curved trocar has been advised and employed, but it is quite unnecessary if the silver canula be not suffered to remain.

4thly, The trocar is to be withdrawn, and a flexible gum catheter is to be passed through the canula into the bladder; the canula is then to be removed, and the elastic catheter is to be confined to a T bandage, or to a tape passed between the thighs.

After-treatment.—When the patient has sufficiently recovered from the inflammation which the disease and operation have produced, it will be right to begin with re-establishing the urethra.

This operation is easily performed; but it is decidedly objectionable, on account of the urine being liable to produce a diseased state of the rectum.

Dr. Cheston, of Gloucester, told me that he had seen great disease of the intestine occasioned by it.

I was sent for to a patient who had undergone this operation for a retention of urine from a disease of the prostate gland. The bladder had been punctured just before my arrival, yet I easily passed a catheter into his bladder through the urethra. I mention this to show how little the operation was required, and that the enlarged gland did not prevent the introduction of the catheter.

OF THE OPERATION IN PERINEO.

The neck of the bladder around the prostate gland is devoid of peritoneum; and, excepting the posterior surface, where the vasa deferentia and vesiculæ seminales are seated, there is no important part which can be injured by a puncture.

Requires Anatomical Knowledge.—This operation requires more anatomical knowledge than the two which I have described; it is more difficult to perform, and much more care is required to preserve the opening into the bladder; yet, to a scientific surgeon, even this presents but little difficulty. Mr. Cline used always to advocate its performance.

Operation.—The steps of the operation are as follow:

1st, An incision is to be made in perineo, as in the operation for the stone, and it is to be carried to the bulb of the urethra, where it is covered by the accelerator urinæ.

2dly, The bulb is to be pressed by the finger to the patient's right side, and the incision is then carried onwards between the bulb and left crus of the penis, as far as the prostate gland.

3dly, The surgeon is to pass his finger into the wound as far as the left side of the prostate gland, so that it may serve as a guide to the canula and trocar.

4thly, The trocar and canula are to be pushed into the cavity of the bladder, by the left side of the gland.

5thly, The trocar being withdrawn, the canula is left in the bladder to allow of the escape of the urine.

6thly, Through the canula an elastic gum catheter is to be passed and secured, as in the former case.

Subsequent Treatment.—When the patient has recovered sufficiently, the natural canal is to be opened by the use of a sound or bougie; and in all cases of considerable difficulty, when the urine passes freely by the artificial opening, a caustic may be safely employed.

Other Modes of Relief.—Having described the different operations which are performed for the relief of a patient having retention of urine, I shall now proceed to point out the practice which I have myself pursued in these cases.

Most frequent Causes of Retention.—I must premise, that I consider, from the experience I have had in this disease, that nine tenths of the difficulties in passing the urine arises from strictures of the urethra, or from enlargement of the prostate gland: with respect to the latter, I have never yet seen a case in which I could not pass a catheter, made of proper form and size, although I do not wish to be understood to say, that there never can be such a case; but only, that in the course of a very extended experience I have never found an instance of it. I shall say more upon this subject when I speak of the diseases of the prostate gland; but shall now return to describe the mode of relieving retention from diseases of the urethra.

Preferable Operation.—The operation which I prefer is, to open the urethra only, and not to puncture the bladder, which I hold, in the male, to be scarcely ever necessary.

Case.—One night, when giving the surgical lecture at St. Thomas's Hospital, a dresser of Mr. Chandler's, then surgeon to the Hospital, came into the Theatre to inform me that a patient was labouring under retention of urine from the use of a caustic bougie; that the man was in great pain, and that a catheter could not be made to pass the stricture. I said, "I will go with you into the ward after lecture, and do what is necessary." The pupils accompanied me. Upon examination of the man, I found that the stricture was seated in that portion of the urethra which was covered by the scrotum. I tried to pass different instruments, but could not succeed.

Reflecting upon the case, it appeared to me to be exposing the patient to unnecessary pain and danger if I punctured his distended bladder; as, when I directed him to make attempts to discharge his urine, the urethra swelled excessively behind the stricture, from the urine passing as far as its seat. I therefore determined to make an incision into the urethra only, which I immediately did, being directed to the place by the distention which an attempt to void the urine produced. The urethra was opened behind the scrotum, and the urine readily discharged. The patient rapidly recovered without any bad symptoms.

I was also induced to act as I have described, by the following case. I was sent for early one morning to visit a patient with retention of urine, who had a cicatrix at the extremity of the urethra, from a chancre; for some time the urine had passed in a great degree by drops;

and when in a stream, in one not larger than a hair. When I saw him, the urgency to make water was excessive, but not a drop would pass, yet I found that it distended the urethra as far as opposite to the situation of the frænum. I therefore immediately passed a lancet through the cicatrix in the usual seat of the meatus, and so soon as I penetrated the glans the urine rushed by the sides of the lancet.

Case.—Mr. Robert Pugh, of Gracechurch Street, sent to me to visit a patient of his who had a retention of urine from stricture in the urethra, which no instrument would pass. Upon directing him to try to micturate, the urethra could be felt to swell behind the stricture, and I passed a lancet into it behind the obstruction. The urine directly flowed through the opening.

I now never open the bladder, but merely do as I have above described; and I am happy to say, that some of my surgical friends, at our Hospitals, have repeatedly adopted the same plan, and successfully.

I sometimes introduce a female catheter into the urethra through the wound, to prevent extravasation and to permit the easy passage of the urine, but this is not absolutely necessary.

Objections to the Operation.—This operation has been objected to, on the supposition that it requires great anatomical knowledge, and is very difficult to perform:—to the first objection I will say, that he who is adverse to an operation because it requires anatomical knowledge, should immediately give up his profession; for if surgery be not founded upon an accurate knowledge of anatomy, it will be better for mankind that there should be no surgery, as diseases will proceed better with the natural means of relief, than with the aid of those surgeons who are not anatomists.

Difficulty obviated.—With respect to the difficulty of the operation, I would say to him who finds any, pass a catheter or staff to the stricture, and, directed by its point in making the incision, carry it an inch behind, and in a line with the point of such director, and the difficulty will vanish.

The state of the urethra in stricture is very different to that which exists in fistula in perineo: in the former case it is large behind the obstruction, in the latter it is contracted and very difficult to find.

Little Danger in this Operation.—By the mode I have advised, the danger of retention of urine is almost entirely dissipated, for opening of the urethra will be rarely followed by fatal effects.

OF RETENTION OF URINE IN THE FEMALE.

Puncture rarely necessary.—The puncture of the bladder is rarely required in the female; and when it becomes necessary, the surgeon can hardly hesitate in his choice of the mode he shall adopt.

Different Modes.—It might be performed through the vagina, or it might be executed by the side of the meatus between it and the branch of the pubes in some cases; but the former would probably cause a

fistulous orifice, by which the urine would constantly irritate the vagina, and the latter would for some causes of retention be impracticable.

Above the Pubes the best.—The operation above the pubes appears to be, in all respects, preferable to any other ; the steps of it are the same as those in the male, and therefore there is no necessity for my again describing it.

OF AMPUTATION OF THE PENIS.

When necessary.—This operation is occasionally required for a cancerous state of the part.

Disease commences in the Prepuce.—The disease, which renders the operation necessary, commences sometimes upon the prepuce and sometimes upon the glans.

1. When seated upon the prepuce, it begins on a pimple, surrounded by a hard base ; it ulcerates slowly and discharges a bloody serum, occasionally with a mixture of pus. At first, slight irritation only attends it ; and, after a time, the patient experiences sharp darting pains. As the disease extends, a large portion of the prepuce precipitates in it ; and if it be long suffered to proceed, a gland in one or both groins becomes affected. A phymosis is gradually produced, and a division of the skin must be made, to ascertain the exact nature and extent of the disease ; and if the complaint be decidedly cancerous, it will be best to complete the operation at once, by cutting away the whole of the affected prepuce by a circular incision, and then securing the divided vessels. When the bleeding has ceased, a poultice should be applied, with which the wound heals better than by any other dressing.

Commencing in the Glans.—2dly, When the disease begins upon the glans penis, it usually makes its appearance in the form of a wart, attended with considerable irritation, and a discharge of serous fluid. The wart ulcerates, and the surrounding parts acquire a great degree of hardness and swelling. Other warts, of a similar nature, are produced, so that the ulcers become numerous : they also extend deeply, and phymosis is occasioned by the surrounding tumefaction. Great impediment arises to the passage of the urine, but at length apertures form from the urethra through the skin of the penis : the patient suffers from irritation of the raw surfaces by the urine, and the disease is accompanied with those lancinating and shooting pains, which usually attend cancerous affections.

If the prepuce be slit up, the whole glans is found swollen, and excessively hard ; and the penis, from the number of its warty excrescences, and from their eversion, has somewhat the resemblance in its appearance to the cauliflower.

State of the Corpus Spongiosum.—The corpus spongiosum and the urethra are diseased nearer to the pubis than the glans, and the surgeon must examine with care the extent of the complaint in that direction.

Hæmorrhage.—Free hæmorrhage from the ulcerated surfaces occasionally occurs, the glands in the groin become enlarged, and sometimes several in each groin; and when this happens all hope from surgery has vanished. The glands sometimes ulcerate and produce a very troublesome sore, with everted edges and irregular surface, a serous discharge, and sometimes free hæmorrhages.

Destruction of the Penis.—The penis continues ulcerating until that part which is naturally pendulous becomes destroyed, occasioning retention of urine, and great difficulty in its discharge at other times. The urine passing in various directions excoriates the scrotum, and leads to a most painful but lingering termination of existence.

Frequent Cause.—The disease is often the result of a natural phymosis, leading to a confined and irritating state of the secretions of the glandulæ odoriferæ; and, when the constitution becomes unhealthy, to the production of unnatural actions in the part.

Medicine of no Service.—As to the treatment of this disease, nothing is to be done by medicine or applications, but to tranquilize the parts, and to keep them clean.

Irritating Applications prejudicial.—All irritating applications should be avoided. Poultices, ointments of bismuth, lead, chalk, opium, zinc, may be alternately employed, as that previously used loses its effect.

Arsenic.—Arsenic I have tried in these cases, but have never succeeded with it; on the contrary, it has greatly irritated and made the sore more extensive and the warts more numerous.

Removal.—The only means by which the effects of this dreadful malady can be averted, consist in the early removal of the diseased portions of the penis.

It is required, in doing this, that the surgeon proceed somewhat beyond the exact limits of the disease; more especially must he examine with care the urethra and corpus spongiosum, in which the complaint is usually most extensive.

The operation is dreadfully painful, but it lasts only for a moment.

Operation.—Its steps are as follow:

1st, Draw forward and elongate the penis as much as is possible.

2dly, Tie a piece of narrow tape tightly around the penis at the pubes.

3dly, Make a direct cut through the penis, behind the disease, without any attention to preserving the integuments to cover the corpora cavernosa and corpus spongiosum; for to do so is a great evil, by preventing a free escape of the urine.

After-treatment.—4thly, Tie a tape tightly around the remaining part of the penis, and make pressure upon it, and there is no necessity for securing any blood-vessel.

When the bleeding has stopped, remove the tape and apply lint upon the wound.

In a few hours, the necessity of micturating will remove the dressings;

and when the danger of bleeding has ceased, a poultice should be applied as the best means of exciting granulation and of healing the sore.

Introduction of Bougie.—When the surface begins to granulate, a piece of bougie, two inches long, is to be worn constantly in the urethra, to prevent its contraction, otherwise it gradually closes as the wound heals, and produces retention of urine.

LECTURE XXVI.

OF FISTULA IN ANO.

Definition.—THIS is an abscess of the cellular membrane, near to the rectum, which produces an aperture into the rectum, or by the side of the anus.

Difficult to heal.—If it be asked why this abscess is so much more difficult to heal than others, and why it frequently requires an operation; the answer is, that from its vicinity to the rectum, it is influenced by the action of the sphincter and levator ani; and that these muscles have a constant tendency to prevent the union of the granulations and coalescence of the sinus. It therefore rarely happens, but that the surgeon is required to assist nature in the restoration of the parts to a healthy state, by dividing the sphincter, and thus destroying its influence upon the sinus.

Symptoms.—The symptoms of this disease are, pain near the anus, with considerable hardness, bearing down, and tenesmus upon going to stool, and difficulty in the evacuation; throbbing and darting pain in the rectum, and on the diseased side of the nates. A fluctuation is perceived; and if the case be left to nature, the abscess breaks either into the rectum, and the matter and blood are discharged with the fæces, or it breaks externally near the anus, but sometimes at a distance from it, either in the perineum or in the nates. The matter which issues from the abscess is sometimes excessively putrid, extricating a considerable quantity of air, and is highly offensive.

Discharge of the Matter.—The fistulous orifice, when it is formed into the rectum only, is the most difficult of management, because the orifice is with difficulty discerned. When the abscess breaks both externally and into the rectum, it is most easy of treatment; but it generally discharges itself only externally; and a probe, when introduced, passes to the side of the rectum, sometimes to the external surface of the intestine, at others from half an inch to an inch from it, so that the original seat of the matter is in the cellular tissue surrounding the rectum.

Extensive Sinus.—I have several times known a sinus form on each

side of the anus, and communicate around the rectum, of which we have a preparation in the collection at St. Thomas's Hospital, so that the rectum has been considerably separated from the surrounding parts. I examined a man who died of a discharge from a sinus in the groin, and who had a fistula in ano; and upon tracing the sinus in the groin, it passed under Poupart's ligament, and took the course of the vas deferens, and descended into the fistula in ano.

Small Sinus.—Sometimes the sinus only just reaches the sphincter, and is extremely small, at first appearing only as a suppuration of one of the follicles of the anus. Sometimes the matter burrows four inches by the side of the rectum.

Caused by a Tile.—The abscess has, in some instances, its origin in a suppurating pile.

Origin sometimes Local.—Fistula in ano is, in a few instances, a local disease, depending upon a change in the part itself; but is much more frequently the result of distant visceral complaints, and of a broken state of the constitution.

How produced.—When confined to the part, it arises from obstinate costiveness and the efforts to discharge the fæces; and the passage of an indurated stool produces inflammation of the muscles and cellular tissue of the rectum. But the opposite state to the above I have several times known produce it; thus, in a severe diarrhœa, which determining large quantities of blood to the rectum, and being accompanied with tenesmus, is followed by inflammation and suppuration at the extremity of the rectum.

But the more common cause is disease of the liver, which, preventing the free return of blood from the intestines, leads to inflammation at the anus, and by influencing the secretions for the intestines, occasions a similar effect.

Diseased states of the lungs are also frequently giving rise to it; from the impediments they produce to the free return of blood, local venous congestion is produced: piles are a common effect, and abscesses at the anus frequently follow.

Connected with Phthisis.—Often, therefore, before a person perishes from phthisis, he has a fistula in ano; and this is the reason fistula is considered as a dangerous disease; although in reality it is not so, but it is the consequence of more important diseases, which destroy life.

The surgeon often brings discredit upon himself by operating in these cases in the last stage of phthisis, when no operation ought to be performed, and when it is impossible the disease can be cured; therefore that death, which is the result of pulmonary disease, is falsely attributed to the fistula in ano.

Treatment, Medical.—The medical treatment of this disease consists in restoring the secretions of the liver and intestinal tube, by submuriæ hydrargyri, or pil: hyd: at night, and infus: gentianæ compositum, with soda and rhubarb, twice in the day; and if there be any pulmonary or pectoral disease, its treatment must precede, and its cure be performed, before any active local means of treatment be had recourse to.

The strength of the patient must also be restored before any operation be performed, or the wound will not heal favourably.

Local.—If a patient applies with a tumour near the anus, threatening the production of an abscess, and the general health be tolerably good, its treatment is to be as follows:—apply leeches to the part, and let a lotion of the acetate of lead be constantly kept upon the surface. Give to the patient the confectio sennæ with sulphur, as the most gentle aperient; all drastic medicines exert too much action of the muscles of the rectum, and determine blood to the anus, so as to add to the irritation and increase the disposition to suppuration.

To be opened Early.—If the swelling increase and become more painful, apply fomentation and poultice to the part. When a fluctuation can be perceived, put a lancet to the swelling, as an early opening prevents a large collection of matter, and I have known the wound immediately close and no fresh accumulation follow.

If it break by natural efforts, it is best to suffer it to discharge and to fill by granulating, to make the sinus as small as possible before any operation be performed.

The sinus very rarely heals entirely by natural processes, because, so soon as its sides adhere, they are pulled asunder by the action of the sphincter ani, and union is thus constantly prevented.

Four States of Fistula.—There are four variations of the fistula, as regards the operation.

Operation for the First.—The first is that in which the abscess breaks into the rectum and near to the anus; and the operation consists in the following steps: introduce a probe into the sinus, by the side of the anus, and carry it into the rectum, so as clearly to ascertain the course of the sinus, and to learn if any part of it extends above the opening into the rectum. Then introduce the director, and pass the probe-pointed bistoury of Mr. Pott through the sinus into the rectum. The finger covered with oil is next to be introduced into the intestine, and is to be placed upon the extremity of the probe-pointed bistoury; then, if the sinus be of considerable length, the finger and knife are brought out together, so that the knife cuts the intestine and sphincter as it is withdrawn. If any portion of the sinus remain above the opening into the rectum, it should be divided with the probe-pointed scissors; one blade of which is passed into the extremity of the sinus, and the other into the rectum, and then, by shutting them, the sinus is divided. If the opening into the intestine be situated only a short distance from the anus, the end of the bistoury may be first brought out at the anus, and the operation completed by pushing the knife forwards.

Second State.—The second state of the sinus is that in which the opening is only at the anus; and when the probe is passed into it, it is felt at the extremity of the sinus, at some distance from the rectum.

Operation.—In this case, what I do is this: I pass the probe-pointed bistoury to the extremity of the sinus and my finger into the rectum. I then, with the extremity of the finger and the finger-nail, move the

rectum upon the blade of the knife near its probed extremity, and sometimes move the knife a little at the same time. Thus I easily make the knife divide the intermediate parts, and then bring its probed points into the rectum, when the operation is concluded as in the first case. I have known, in this instance, the division made by the sharp-pointed curved bistoury ; but the objection to it is, that its point rarely takes the course of the sinus : then a portion is left undivided.

Savigny, an ingenious instrument maker, made a double bistoury, with a pointed and a probed knife : the one sliding by the side of the other. When it was introduced the sharp-pointed bistoury was thrust forward, and then retracted, and the probed bistoury succeeded it ; but the objection to this instrument was, that it was too large for its easy introduction into the sinus, and it is really quite unnecessary.

Third State.—The third state is, that where the sinus enters the rectum, and has no external opening. It is required, if the orifice cannot be felt by introducing the finger into the rectum, to wait until an accidental inflammation leads to the capacity of feeling a swelling externally, when a lancet should be put into it from the side of the anus. A probe being introduced, it passes into the suppurating cavity communicating with the rectum.

Operation.—In this case it will be proper to perform the operation which has been described for the first state of fistula when there is an opening externally, and within the rectum.

Fourth State.—The fourth and last state is, that in which the sinus or sinuses extend from the anus into the nates.

Operation.—The practice I pursue is, then to divide the opening in the nates through the external skin, but leave that near the anus at first undivided, and when I have healed this part, then operate upon the other in the same manner as in the second kind of fistula.

OF TREATMENT AFTER THE OPERATION.

Local.—When the fistula has been divided, put dry lint into the wound, and compress the part until all bleeding has stopped. On the following morning apply a poultice, and in two or three days the lint will separate. Then pass a probe into the wound often, to prevent the union of the sides of the sinus for five or six days from the operation, and continue to poultice ; but after this time, when granulations arise, it is right to introduce lint into the wound, and prevent their inosculation, until the wound, gradually granulating everywhere, the cavity becomes filled. If lint be introduced into the wound on the second, or third, or following days from the operation, great pain is given, and much inflammation is excited, so that there is danger of fresh suppuration : wait, therefore, until the inflammation has ceased, and then introduce but a small quantity of lint, and with great gentleness.

Constitutional.—If the sore be very indolent, occasionally purge the patient, and give him the confectio piperis, which produces very

healthy granulations, and apply to the wound lint dipped in a solution of the sulphate of copper, or spread with the unguentum hydrargyri nitrico oxydi.

OF INJECTIONS FOR FISTULA.

Of the Cure by Injection.—Although, as it will be readily believed, I have seen a multitude of cases of fistulæ, I have only known two cured by injection, which were as follow.

I was attending, with Mr. Pugh, surgeon, of Gracechurch Street, a lady, in Fenchurch Street, who had a fistula on each side of the anus. I opened one fistula, and cured it ; but the patient would not submit to the operation upon the other. Mr. Pugh and I therefore agreed that we would try other means, and we injected into the sinus with oxymurias hydrargyri, the liquor calcis gr. 1. ad $\frac{3}{4}$ j. and the sinus healed.

Case.—The second case was a gentleman from the North, a friend of Lord Harewood, who had been under the care of Mr. Hey, of Leeds, for a fistula on the right side of the anus, and who came to me for advice. The fistula was of great depth and distance from the rectum upon the opposite side. I feared opening it, both from the delicate health of the patient, and the danger of hæmorrhage ; and therefore threw into the sinus equal parts of port wine and water. My nephew, Mr. Bransby Cooper, finding it did not bring on sufficient inflammation, injected port wine, undiluted, and thereupon inflammation followed ; adhesion was produced, and the case terminated without further alteration.

OF SETON FOR FISTULA.

Of the Cure by Seton.—Timid persons prefer this mode of treatment to the knife, although in the one case the irritation is long continued, and in the other the pain is only of a few minutes' continuance.

That it succeeds, in some instances, I have known ; for some of my patients, having submitted to this remedy, returned to me well.

My objection to it is, that the irritation it produces is liable to occasion other abscesses, whilst healing that for which it is employed.

OF PILES OR HÆMORRHOIDS.

Two States.—These are found in two states, viz., a varicose enlargement of a vein ; or an excrescence arising from its adhesion and organization.

The first is external or internal.

Of the External.—The symptoms of the first are an external

swelling, which feels round and hard, which is painful at the passage of the stools : is hot, and itches at other times. It sometimes bursts, and discharges blood with the stools. In a few days it declines and disappears. Sometimes it becomes inflamed, and very acutely painful; and it now and then suppurates, and lays the foundation of fistula. If cut into before suppuration, a large and very solid clot of blood passes from it.

Repeated returns of this complaint engender an excrescence, which arises from the swelling having undergone adhesion, and becoming organized, forming a cutaneous tumour which is very vascular. The skin over it is thin,—the substance very irritable, and pains shoot from it into the rectum to a considerable height from the anus. I have known a person confined to her bed from the excoriation and suffering produced by such excrescences originating in external piles.

Internal.—The internal piles are originally enlarged veins : they produce pain about the sacrum, bleed frequently, and render the passage of the motions difficult ; and the stools are often mixed with blood.

At length many of these become obliterated by adhesion, and form very vascular pendulous tumours in the entrance of the rectum.

Occasion Prolapsus Ani.—They often occasion prolapsus ani ; the patient feels as if there was more motion to discharge, and he forces the rectum until a part of it becomes everted, and the internal piles appear externally, thus producing prolapsus ani. The patient, after each evacuation, is obliged to return these with the finger ; the evacuation is in consequence highly painful, tedious, and very often the return of the part is exceedingly difficult.

Profuse Hæmorrhage.—The bleeding from the piles thus everted is often so profuse, that the weight of the blood exceeds that of the fæces. They sometimes vent a considerable serous discharge. When the number and size of the piles, and the degree of prolapsus becomes great, and there is much difficulty in their return, inflammation sometimes arises in them, and their return is rendered impracticable, without giving an unjustifiable degree of pain. When in this state, in addition to other sufferings, the urine is retained, the fæces pass with extreme difficulty, and there is a free sanious discharge from the part. When thus inflammation is the result of a strangulation of the piles from the pressure of the anus, it is immediately relieved by the return of the parts ; but often the inflammation precedes the descent, and then the parts are too tender to be returned. It now and then happens that by this process nature effects a spontaneous cure of the disease ; the parts proceed to gangrene, and a slough of the piles is produced, the rectum ceases to prolapse, and at least for a great length of time the patient is rid of his complaint.

Causes, Sedentary Habits.—The usual cause of piles is a sedentary habit, which leads to congestion of blood in the vessels of the rectum.

Diseased Liver.—A diseased state of the liver is also a cause, by preventing a free return of blood.

Obesity.—Obesity occasions them, by the pressure of the omentum and mesentery upon the mesenteric veins.

Pectoral Disease.—They, like fistula in ano, frequently arise from pectoral complaints, which affect respiration and the freedom of circulation.

OF THE TREATMENT OF PILES OR HÆMORRHOIDS.

Of the External.—If a patient applies with an external pile, open his bowels freely with confectio sennæ and sulphur. Apply leeches to the parts, and a lotion of acetate of lead. If, when the inflammation be subdued, the vein remains enlarged and hardened, puncture it with a lancet, and discharge a large and very firm clot of blood which it contains.

If it suppurate, fomentation and poultice will be the best applications: and when it bursts, if it shows no tendency to heal, it must be opened into the rectum.

Removing Excrescences.—The excrescences left by external piles are growths only of the skin, and they may be freely removed when they become troublesome. Subdue the inflammation first, with evaporating lotions, and then remove them by scissors, or by the knife. The former is by far the most painful mode to the patient, but most easily performed by the surgeon.

Do not bleed.—These excrescences furnish no bleeding of any consequence.

Mode of Removal.—I generally pass a tenaculum through them, draw them towards me, and cut them off with a lancet.

Treatment of Internal Piles.—The treatment of internal piles is more difficult, and requires attention to a number of circumstances.

Medical.—First. The medical treatment demands the exhibition of confectio sennæ cum sulphure; the bals: copaibæ is also a good medicine. If there be hepatic congestion, gentle doses of blue pill should be given, to restore the biliary secretions; in general, however, mercury disagrees in piles: Ward's paste, or confectio piperis of the London Pharmacopœia, is an admirable remedy, opening the bowels gently and contracting the dilated vessels: soda and rhubarb I have known useful. If piles arise, as they sometimes do, from diarrhœa, the confectio opiata, is the best medicine.

Local.—The local treatment, to prevent their increase, is to inject cold water into the rectum twice per diem; a dilute aluminous injection is also useful combined with decoction of oak bark.

Diet.—The diet must be attended to; animal food is better than vegetable, as occupying less bulk to afford the same degree of sustenance, and consequently presses less upon the returning blood-vessels. Mutton is the best butcher's meat. White fish is easy of digestion. All flatulent food should be avoided. A good deal of exercise should

be taken ; and I have seen, in the incipient state of this disease, horse exercise of great benefit.

Hæmorrhage.—When the piles bleed, the medicine should be infusion rosæ cum magnesiæ sulphate ; cold water should be still injected.

Prolapsus.—If prolapsus be produced, it should be washed with a solution of alum and oak bark, and it should be returned by a piece of linen dipped in oil, or covered by ceratum cetacei.

Inflammation.—When the piles are inflamed and a prolapsus is produced, purge the patient once freely ; apply leeches ; foment and poultice the part, and give opium as soon as the purgative medicine has operated. For two or three days let the bowels be quiet: the leeches, fomentations, and poultices being continued, then purge again ; for daily purging adds to the inflammation and irritation.

I have known the application of cold water to the prolapsus useful, also the acetate of lead lotion, and the lotion mixed in a poultice, agrees best upon the whole ; although the warmer applications are the most congenial with the patient's feelings.

Puncture.—Spontaneous bleedings from the piles greatly relieve them ; and I have therefore sometimes punctured them with a lancet, with a view to the relief of the congestion of the vessels.

However, all the means which can be employed will not always prevent their increase ; nor when they are once suffered to acquire considerable magnitude, and to produce prolapsus ani, can they be subdued by any medical or local treatment short of operation.

Mode of Examination.—To examine a patient properly under these circumstances, and to enable you to form a correct judgment of the necessity for, and the mode of, operating, it is necessary that the patient should have an evacuation ; and that, before the return of the prolapsus, the surgeon should examine the part.

He will then observe a portion of the rectum, forming the outer circle, and a number of round and dark-coloured projections, occupying the more central parts of the protruded mass. The operation is then ascertained to be necessary or not, according to the degree of prolapsus and the number and size of the piles.

Having determined that an operation is required, it is next to be considered in what manner it is to be performed.

Two Modes of Operation.—It may be done by excision, or by ligature, or it may be effected by a combination of the two.

Excision.—For excision, in the early part of my surgical career, I was a strong advocate ; for I found it a less painful operation than ligature, and it appeared to me not dangerous ; but as my experience increased, I was induced to change my opinion, and to consider excision as not divested of danger.

The three following cases are proofs of this : the first, dying of inflammation ; and the second and third from hæmorrhage. I have also seen, in a fourth case, extensive suppuration produced by excision.

Case.—Mrs. O——, the wife of a respectable medical man, came to London to have some hæmorrhoids removed ; and I advised their

excision, observing, that her constitution was of a feeble and irritable kind. I removed only one of three which appeared. In three days after the excision by scissors, I found her complaining of great pain in her abdomen, from intestinal and peritoneal inflammation: she frequently vomited, and her abdomen became tense. The symptoms were not relieved, although motions were procured, and she died in a week from the operation. The internal surface of the intestine, and the peritoneum, were inflamed extensively.

Case.—Mr. Esdaile came to London from Guernsey or Jersey, in order to have a hæmorrhoid removed. Mr. Lemon and I attended him, and I removed a single pile by scissors. On the following day he was exceedingly low, his pulse small, so as to be scarcely perceptible. On the next he voided a great quantity of blood from his intestines; and on the day after he died, falling a victim to internal bleeding, from the return of the divided vessel with the prolapsed intestine.

Case.—The Earl of S—— applied to me for piles with prolapsus ani, and I removed some of the largest with scissors; the prolapsus was greatly relieved; and for more than twelve months after he was little troubled, either with hæmorrhoids or prolapsus. About two years afterwards he again applied to me, for a return of his complaint; and seeing his age, and having examined the piles, I thought before I operated, I would have a consultation, when the operation of excision was again recommended. I removed with the scissors one of the largest, and desired his lordship to keep the recumbent posture. He laid down upon the bed immediately after the pile was removed. In about ten minutes he said, “I must relieve my bowels,” and he rose from his bed and discharged into the close stool what he thought to be fæces, but which proved to be blood. In twenty minutes he had the same sensation, and evacuated more blood than before, in about the same lapse of time: he again rose, and soon became very faint from the free hæmorrhage. I, therefore, opened the rectum with a speculum, and saw an artery throwing out its blood with freedom; I therefore requested him to force down the intestine as much as he could, and raising the orifice of the bleeding vessel with a tenaculum, secured it in a ligature, and also compressed the artery with a piece of sponge. His lordship bled no more. On the following day he was low, his pulse very quick, and he had a shivering: on the next he complained of pain in his abdomen; he had sickness, and tenderness upon pressure, and in four days he died. In the presence of Mr. Wardrop I opened his body, and found inflammation of the rectum, and disease of the glandulæ solitariae of the intestine, they being enlarged and hardened, so that the intestine internally had a curious spotted appearance. He was not, therefore, a healthy or sound man in other respects; and it is in such cases that unexpected symptoms arise after operation.

Ligature.—As a ligature prevents the danger of bleeding, it is best to use it, although the process is more tedious and painful. The pain which it produces may be mitigated by not drawing the ligature too

tight. Draw down the pile with forceps, or a tenaculum, and tie a piece of waxed silk around it, draw the knot until the patient complains severely, then tie a second, cut off the ligature a little way from the knot, and return the intestine and pile.

Double Ligature.—But in cases in which the pile is very large, a safer and less painful plan may be adopted; namely, to pass a needle and ligature through them, and to cut them off beyond it.

Operation.—The mode of operating for these large hæmorrhoids is as follows: Draw down the pile, pass a needle, with a double ligature, through its juncture with the intestine. Cut off the needle, and the two ligatures will remain on the pile; then tie one above, and the other below, and thus the whole pile is included; then cut off the pile with a lancet or scissors beyond the ligature, and in the evening or on the following day, the threads may be removed, as all danger of bleeding has ceased.

By this operation hæmorrhage is prevented, and the pain is exceedingly diminished, as the ligature does not require to be made very tight.

The prolapsus ani generally soon ceases after the complete removal of the piles; but if it does not, cold and astringent injections should be employed, and the *confectio piperis* be given.

LECTURE XXVII.

OF POLYPUS OF THE NOSE.

Four kinds.—POLYPI of the nose are of four kinds: 1st, The common pendulous polypus; 2d, The hydatid polypus; 3d, The cancerous; 4th, The fungoid.

OF THE COMMON PENDULOUS POLYPUS.

Symptoms.—This disease is marked in its commencement by an occasional obstruction in the nose, as if from catarrh; the obstruction being increased in foggy and damp weather, and being greater early in the morning and late in the evening than in the middle of the day.

Age.—Persons of all ages are subject to the formation of these polypi: but it is of more common occurrence between the ages of forty and fifty than at any other period.

Appearance.—On looking into the nose, a jelly-like appearance is seen, which, upon directing the patient to inhale through the nostrils,

recedes, and upon his exhaling advances and re-appears ; the degree of motion, however, necessarily depends on the magnitude of the polypus compared with that of the nostril. The voice has a nasal sound, and there is generally some uneasiness felt between the eyebrows, in the situation of the frontal sinuses.

Seat.—The polypus grows from that portion of the schneiderian membrane which is situated upon the same side with the turbinated bones. I have never yet seen a polypus growing from that covering, the septum narium. The body of the polypus is generally yellow, and is streaked with few vessels. Its neck diminishes often to a very small stalk. Now and then two or three polypi grow from a single stalk. When a polypus becomes very large, instead of advancing to the nostril it recedes into the throat, appearing behind the velum palati ; and sometimes when it grows from the back of the nares, it makes its first appearance in the throat. It here becomes of very considerable size, and at length would readily allow a ligature to be passed around it ; but this, as I shall presently describe, is not the best mode of its removal. When it appears in the throat, I have seen its body divided into a number of different portions.

In the collection at St. Thomas's Hospital, their great size and broken surfaces are well seen in many preparations, as well as their origin from the pituitary membrane.

OF THEIR REMOVAL.

An Operation necessary.—No other mode than an operation will succeed in removing these excrescences. I have repeatedly tried the application of caustic ; but it only acts upon the surface, and the root grows faster than that surface can be destroyed. Aluminous and other astringent applications render the breathing a little more free at the moment, but produce no permanent relief.

Three Modes.—Three modes have been proposed for their removal : 1st, by laceration ; 2d, by excision ; 3d, by ligature.

1st, By Laceration.—1st, Laceration is the usual mode. For this purpose, a surgeon should be provided with two pair of forceps ; one pair slightly curved, terminating in a point hollowed at the end, and that hollow containing pointed teeth, having an aperture in each blade. A second pair, formed like common dressing forceps, only the blades longer and more slender, having serrated teeth, received between each other like a serrated suture of the skull. These can be received into the smallest nostril, and readily made to act in any part of it.

Operation.—The operation is performed as follows : the patient sits upon a chair opposite a strong light, a probe is then introduced into the nostril, and the surgeon feels with it the exact situation of the stalk of the polypus ; then withdrawing the probe, he passes the forceps to the stalk, and, enclosing it between the blades, with very gentle jerks, he either tears through the stalk, or draws away the portion of membrane

from whence it grows : instead of removing it by jerks, the surgeon may turn the instrument upon its axis, and thus lacerate the stalk of the polypus. Now and then a thin film of bone separates with the pituitary membrane, which only more effectually secures the patient from a return of the disease.

If more than one polypus exist in the nostril, a separate operation is required for each ; and if they exist upon each side, the operation may be performed on the same day in each nostril, for there is no danger in this operation. I never knew but one person die in consequence of it ; he had previously had some disease in the brain, a piece of lint was placed in the nostril, after the operation, and this gentleman died a few days after of inflammation of the brain. It is better not to introduce lint, or any extraneous substance likely to produce irritation, immediately after the operation.

No serious Hæmorrhage.—The hæmorrhage which results from this operation never amounts to any serious quantity.

As the disease is liable to return, when the inflammation succeeding the operation has subsided, aluminous injections may be used, or the liquor calcis with oxym : hydrarg : to lessen the disposition to the return of the complaint.

To remove them from the posterior nares I have used curved forceps, introduced behind the velum ; but they do not answer so well as the mode I have next to describe.

OF THEIR REMOVAL BY EXCISION.

2d, By Excision.—This operation requires a pair of scissors with probed extremities, made straight, with long and slender blades.

Operation.—The patient being placed as in the former operation, the scissors are first introduced shut, in order to ascertain the attachment of the polypus ; and being then opened, the stalk of the polypus is cut through ; then the surgeon, closing the other nostril, directs the patient to blow forcibly through that in which the operation has been performed, when the polypus is immediately ejected ; but if the polypus appear in the pharynx, the surgeon divides the stalk in the same manner as before, and then putting his finger behind the velum palati, he with it draws the polypus away through the fauces. In that way the largest polypi are to be removed ; and I have never seen either danger or difficulty arise from its performance ; but, on the contrary, have several times succeeded when the forceps by the nostrils had been employed in vain.

Objection to this Mode.—It has been objected to this mode of operating, that very considerable hæmorrhage is produced by it ; but this can only arise from a very indiscreet manner of performing it, by repeatedly cutting the pituitary membrane, which could hardly happen with probed scissors.

3d, By Ligature.—The third operation, namely, that by ligature,

is now very generally abandoned by surgeons, on account of the difficulty of its application, and the necessarily imperfect removal of the disease.

Disease resembling Polypus.—There is a disease in children very frequently mistaken for polypus, by men who have not had much experience in surgery. It is an elongation of the pituitary membrane of the nose, from relaxed constitution, and from effusion of serum into the cellular tissue of the part ; it is red and very vascular. It appears more upon the extremity of the superior turbinated bone than upon the inferior ; but I have seen it upon both. It sometimes becomes chronic. It requires alterative medicine, and the application of a solution of alum, or of sulphate of copper, or nitrate of silver. I have more than once known this disease removed by forceps cruelly and unnecessarily.

OF HYDATID POLYPUS.

Occurring in Young Persons.—The nostrils of young persons sometimes become filled with growths which appear of the hydatid or encysted kind. They resemble wetted bladders hanging within the nose, are unattended with pain, but produce the inconvenience of occasional obstruction. When pressed with forceps they burst, and discharge a mucus, somewhat resembling that secreted by the schneiderian membrane ; the cyst only is removed by the forceps. The nose may be repeatedly cleared of them by instruments, but they are always regenerated. By continued growth they enlarge the nostrils, and deform the face.

Two Modes of removal. By Alum.—I have seen them removed in two modes : 1st, By the use of a strong solution of alum introduced on lint, and constantly worn ; 2dly, By the daily application of the muriate of antimony used by a dossil of lint through the medium of a canula. The first is the preferable mode ; but I cannot decidedly speak as to its preventing the return of the disease : they are destroyed more quickly by the muriate of antimony, but with much more suffering.

OF THE CANCEROUS POLYPUS.

Occurs in Elderly Persons.—This is a disease of age.

Symptoms.—It commences with obstruction in breathing, but is, at first, unattended with pain ; as the disease increases, the sufferings are very acute, and not confined to the diseased part, but extend to the different branches of the fifth pair of nerves, striking sometimes into the brain itself.

Slow Growth.—Its growth is slow, and it is some time before it

produces any discharge ; but at length it ulcerates, and discharges a bloody serum.

Colour.—Its colour is purple ; its feel is firm. It sometimes bleeds with great freedom. It sloughs, and in its progress it produces great alteration in the form of the face, which it disfigures horribly. It extends into the sinuses, and frequently affects the lachrymal sac.

It often alters the roof of the mouth, producing absorption of portions of the superior maxillary and palate bones.

Destroys Life gradually.—It is a long time in destroying life ; the latter days of the patient cannot but excite pity in the most unfeeling bosom. Medicine and surgery do nothing for this disease ; excepting opium, belladonna, hemlock, and hyoscyamus are administered locally and constitutionally to mitigate, in some degree, the patient's tortures ; and the dose of the former is at last increased to keep the patient in a constant state of torpor.

OF THE FUNGOID POLYPUS.

Occurs at all Ages.—The fungoid polypus occurs at all periods of life ; but the best case which I can give of this disease is the following.

Case.—A young gentleman came to my house with a large purple excrescence projecting from the nostril, which completely obstructed the passage on that side. I made a cast of this disease, which is now in the collection at St. Thomas's Hospital. There was a copious discharge of sanious fluid from it ; but the disease was little painful, and the general health was, at first, but little affected. I passed a ligature around the root of the polypus as high as I could reach, and it sloughed away without hæmorrhage. I was gratified with the result of this operation, as the patient appeared to be greatly relieved ; but some time afterwards I heard that the disease had returned, and that it had been again removed. It again grew, and ultimately destroyed life. The head was examined, and the disease was found to have grown from a very small surface of the pituitary membrane.

Extends.—In general the disease enters the different sinuses, affects the lachrymal sac, and ductus ad nasum ; bleeds copiously, but has not the pain accompanying cancerous disease. The patient dies from copious discharge, the frequent hæmorrhages, and at last from nervous irritation.

OF POLYPUS EXCRESCENCES IN THE PHARYNX.

I have seen two cases of this disease.

Case.—One in a Spanish gentleman, who came through Paris, where he consulted various surgeons ; and on his arrival in London, asked my advice for a polypus excrescence in his pharynx, of the colour of the mucous membrane of this portion of the alimentary tube, beginning

from the fold over the palato-pharyngeus, and hanging down like a sausage into the pharynx. By great efforts he could regurgitate it into his mouth. I requested him to permit me to pass a ligature around its root, which I succeeded in doing, without much difficulty, and it separated in eight days.

Case.—I lately saw a second case, with my nephew, Mr. B. Cooper: it was similar to the former in appearance, but not quite so large, and grew more from the root of the tongue. I removed it also by ligature, and both these cases completely succeeded.

POLYPUS OF THE RECTUM.

I have several times seen the following disease.

Case.—A lady sent for me to see her infant, who, she observed, after a motion, had a substance like an earth-worm appear at the anus, of considerable length, and of a red colour. Upon examination, after an evacuation, I saw at the anus a red projection, and upon pulling it down, found it to be of considerable length, growing about an inch to an inch and a half from the anus, attached to the interior of the rectum. I drew it down, put a thread around it, and cut it off as near to its origin from the rectum as I could, and it never returned.

Case.—Some time after a child was brought to me from Surrey, with the same disease; the substance looked like a leech, and I cut it off without putting a thread around it. Whilst at Lecture I was sent for to attend the child on account of hæmorrhage, and I begged Mr. H. Cline to visit the patient for me; but he soon returned and informed me, that the bleeding had been of little consequence, and had stopped spontaneously. The child recovered.

Case.—In a stone patient of Mr. Gaitskell's, upon whom I was operating, the child having prolapsus ani, I saw a small excrescence, red and pendulous, growing upon the mucous membrane of the intestine, which I thought was the commencement of one of these diseases.

Case.—I have only twice seen this disease in the adult; once at the age of 23 years: I put a ligature upon its root, and removed a portion beyond the ligature, having the external appearance of a common earth-worm.

Case.—An apothecary of Bristol, a friend of Mr. Brickenden, surgeon, in the Borough, came to me some years ago with a polypus growing in his rectum, about two inches from the anus, which I removed: he had previously been subject to dyspeptic symptoms, with great irritability of the rectum, which subsided after this operation, and the use of alterative medicines which were given him.

OF FUNGOID POLYPUS OF THE RECTUM.

Case.—A gentleman was brought to me by Dr. Hopkins, of Peterborough, who laboured under this disease, the symptoms of which were

a copious and sanious discharge from the rectum : very little pain ; but upon his going to stool, or even by efforts in which the fæces were not discharged, a polypus was protruded, having a broken surface like a cauliflower, large as an egg, and of a dirty brown colour, breaking readily, and bleeding where it broke. The general health had not materially suffered. I put a ligature upon the neck of this polypus near to the mucous membrane of the intestine : it sloughed away in a few days, and for some time the gentleman appeared to be well ; but having occasion many months afterwards to go through Peterborough, I was requested to see this gentleman ; when I found the disease had returned, that the rectum had ulcerated, and that his health was broken ; soon after he fell a victim to the disease.

In the present state of medical and surgical knowledge, this disease, like the scirrhus-strictured rectum, will prove destructive.

OF ENLARGED TONSILS.

Of frequent Occurrence.—Enlargement of this part from common angina is a frequent occurrence ; and it is best relieved by purging, by leeches applied to the throat, or by a blister placed beneath the angle of the lower jaw.

Sometimes Suppurate.—If the gland suppurate, the pain is exceedingly severe ; the attempts to swallow are agonizing, and the painful sensations extend along the Eustachian tube to the ear. When matter has formed in the tonsil, it may be detected by applying the finger to the surface of the gland in the fauces.

Treatment.—Fomentations and poultices assist its progress most effectually ; and I think, upon the whole, that they do best when left to break spontaneously. But when great difficulty of breathing attends the presence of matter, it should be discharged by puncture with a small lancet, or with the knife used to divide the cornea. Some danger attends the operation of opening such abscesses, and circumspection is required to prevent a wound of the internal carotid artery.

After the matter is discharged, the case speedily does well.

Chronic Enlargement.—Sometimes a chronic enlargement of the tonsils occurs, and injures the health by the difficulty of breathing it produces, the person is obliged to sleep with the mouth widely opened, yet still there is much impediment to the passage of the air, and consequently much stertorous noise.

Symptoms.—Children labouring under this disease are often found during sleep in profuse perspiration, especially about the head, arising from this excessive dyspnoea.

Treatment.—The treatment of this state consists in applying powdered alum to the surface of the tonsil ; in using the sulphate of copper, in substance, so as to whiten the surface ; or the nitrate of silver, which produces the same effect, and from the employment of which I have

known great advantage derived ; scarification I have also seen of service.

Removal sometimes required.—If the disease resists these modes of treatment, it will be right to remove the enlarged portion of the gland, either by ligature or by excision.

By Ligatures.—A ligature is employed in those cases in which the tonsil is pendulous, and in which the enlarged part is connected to the throat by a narrow neck.

To apply a ligature, an iron is required, with a small fixed ring at its end, and a waxed portion of silk.

Operation.—The patient sitting before the surgeon, and the thread being passed through the ring of the tonsil iron, an assistant holds one end of the ligature against the cheek, and the surgeon retains the other in his hand. The iron is then carried above, behind, and then below the tonsil, and is, with the end of the ligature, brought out of the mouth ; after thus nearly surrounding the gland, a single knot is made, and one end of the thread being again passed through the ring of the tonsil iron, the knot is by means of it made fast, and a second knot is then made, in the same manner. The silk is left upon the tonsil until it ulcerates through the gland, which it does in about a week.

Another Mode.—When the basis of the swelling is large, a needle has been advised, armed with a double ligature, which is to be passed through the base of the gland : then each ligature is to be tied separately, one before and the other behind the tonsil, and by this mode the ligatures are prevented from slipping ; but their application is very difficult, and, as far as I have seen, very imperfect. Rather than adopt it, I advise the removal of a portion of the gland by excision.

By Excision.—This is to be done by a pair of curved scissors with probed extremities, with which there is less risk of wounding any important part. It is best, however, to remove small portions, and to proceed gradually, by repeating the operation as occasion requires ; and to touch the surface with nitrate of silver or sulphate of copper.

In these cases there is usually much general debility, and it is right to give soda, steel, and rhubarb, and advise country or sea air with bathing, and a generous diet.

OF ELONGATION OF THE UVULA.

Sometimes of great Length.—I have seen this part grow to a considerable length. There is one in the collection at St. Thomas's Hospital, which the boy could throw forwards between his incisores teeth.

Symptoms.—By hanging upon the epiglottis, it produces coughing, or by irritating the pharynx it occasions sickness ; and by creating irritation of the glottis it produces an alteration in the voice.

Cause.—It arises from relaxation and over exertion of the voice in speaking.

Treatment, local.—Stimulating gargles, sulphate of copper in solution, or directly applied in substance, and alum, are useful ; but sometimes the enlargement becomes so distressing, as to occasion a necessity for its immediate removal.

Operation.—The mode in which this is effected is as follows. The end of the uvula is seized with a pair of polypus forceps, and it is then drawn forwards, so as to be put upon the stretch, and that portion which exceeds the natural length of the part is removed by a pair of curved and probed scissors.

No bleeding of any consequence follows ; and the only attention afterwards required is, to avoid any unnecessary exposure to cold air.

Not dangerous.—I have several times had occasion to perform this operation, and have never seen any ill effects arise from it, but often the greatest advantage produced.

LECTURE XXVIII.

PARACENTESIS OF THE ABDOMEN.

Two Kinds.—DROPSY of the abdomen is of two kinds: 1st, Peritoneal, or ascites ; 2d, Encysted, or ovarian.

OF ASCITES.

Symptoms.—The first symptom of this disease is an unnatural sense of fulness in the abdomen after taking food, which renders it necessary to loosen the clothes ; next, an increase of the lower part of the abdomen, observable at all times whilst the patient is in the sitting posture. When the patient lies down, the increase in the abdomen is general, and the enlargement is accompanied with an unusual tension ; as if the abdomen were inflated. In the sitting posture, a fluctuation can be perceived in the hypogastric and lower part of the umbilical regions, by placing the fingers on one side and tapping on the other. In the recumbent posture, the intestines appear to undulate in the cavity, having more than their usual motion. As the disease increases, the swelling extends from the lower to the upper part of the abdomen, occupying the whole cavity.

Little pain is felt, but considerable inconvenience arises from the distension, more particularly when the patient is in the recumbent position, on account of the action of the diaphragm being impeded. In proportion as the distension is greater, the fluctuation becomes distinct ;

and when the tension is extreme, the gentlest tap on the abdomen leads to a perception of the fluid. The secretion of urine is scanty. The enlargement of the abdomen is followed by swelling of the legs, either from the pressure of the fluid upon the veins returning the blood from the lower extremities, or from the general debility which accompanies this disease. I have known, when the omentum has been very considerably thickened, the perception of the fluctuation in the abdomen to be indistinct; and, under the same circumstances, in tapping, the quantity of fluid which has escaped has been a portion only of that contained in the cavity, part being confined behind the omentum.

Quantity of Fluid.—The usual quantity of fluid collected is from twenty-eight to thirty pints; but when a patient has been tapped several times, the abdomen becomes much more enlarged, and the quantity is then from thirty to forty pints. In young persons the quantity is small; and the smallest quantity I have known drawn off by operation was in a medical student; it amounted only to six pints.

Nature of the Fluid.—The nature of the fluid secreted varies but little in ascites; it is much more watery than serum, containing relatively a small proportion of albumen. It has generally a watery appearance, has a slight yellow tinge, and does not vary in its appearance and consistence, as the fluid of other species of dropsy. If inflammation succeeds the performance of the first operation, flakes of fibrin or adhesive matter are contained in the fluid next discharged.

Cause.—The cause of dropsy, when it is confined to the abdomen, is most frequently a disease in the liver, which acts mechanically in producing it. The pressure which the diseased organ occasions upon the vena portæ interrupts the free flow of blood through the vein, produces a congestion in the arteries and veins of the alimentary canal, and of the organs which are connected with it, and consequently leads to a greater effusion from the exhalent extremities of the arteries. Diseases of particular abdominal organs will, by the irritation they excite upon the peritoneum, occasion a greater determination to its secreting surface. Thus disease of the omentum, or of the spleen, will produce this effect.

I have known diseased mesenteric glands produce ascites; and two children, who, in my recollection, have been tapped for this disease, have recovered. Taking large quantities of spirituous liquors tends to produce this complaint, independently of the organic change it is likely to excite in the liver; its stimulus leading to a greater determination of blood to the vena portæ than can readily circulate through this vessel, and consequently to effusion from the extremities of the arteries.

But ascites is frequently the effect of disease in the chest, of water accumulated in the cavities of the pleura, of water in the pericardium, or of some organic change in the heart, interrupting the action of the source of the circulation: the blood therefore accumulating in the right side of the heart and in the veins returning the blood to the right auricle, leads to the production of water in the abdomen, and of a general anasarous state.

It has been a question whether dropsy arises from an increased

secretion of the blood-vessels, or from an absolute diminished action of the absorbent vessels. It is generally the former I have no doubt, for reasons which I have already given, when speaking of hydrocele.

OF THE TREATMENT OF ASCITES.

Medical.—The disposition to this disease may be prevented, its progress, when it has begun, may be retarded, and large accumulations of fluid may be removed by medical treatment, and by external applications. If the disease originate in a complaint of the liver, the restoration of its secretions, and an action upon the alimentary canal by mercury, combined with other purgative remedies, become the best means of preventing effusion. If the complaint originate from local disease in some of the other viscera, as in the spleen, or omentum, the secretions must be increased in a similar manner, and blisters should be applied, and for some time continued, on the abdomen.

If water has already begun to form, the best medicines, as far as I know, are the submurias hydrarg: gr: jss. pulv: gambogiæ gr. ss. scillæ gr: iij. in the form of a pill, taken every night: and spir: æther: nitric: ℥ss. to 3j. oxym: hydrarg: gr. $\frac{1}{2}$. tinct: digital: gutt. xv. with some camphor mixture, twice or three times in the day.

If water has already formed in considerable quantity, and if the powers of the constitution are sufficiently strong for its employment, the use of elaterium becomes not only justifiable but desirable, as being the most powerful and successful mode of promoting the absorption of the fluid which has been effused. But if the powers of the constitution have been much enfeebled, this remedy becomes dangerous from its severe effect. Even if the ascites be accompanied with other dropsical symptoms, the elaterium is still the remedy most to be depended upon, if the constitution will allow of its use.

An Operation necessary.—When medicines fail of their wonted and expected influence, and the accumulation is so considerable as to impede breathing by preventing the free descent of the diaphragm, or when the patient finds it difficult to assume the recumbent posture, it becomes necessary to remove the accumulation by the operation of paracentesis. I have, however, known in a young person the operation performed for comparatively small collections of fluid, when the increase of the collection had ceased, and no disposition to its absorption had manifested itself. It is absolutely necessary that the fluctuation should be extremely distinct before the operation be proposed: and in cases of diseased liver, spleen, omentum, and mesentery, there is danger of the surgeon's being deceived respecting the disease.

Result of an Operation.—With regard to the result of the operation for ascites, when the dropsy arises from disease of the liver, or from organic alteration in the chest, the relief is only temporary; but when it is the effect of constitutional disease, as fever, or arises from functional change only, under these circumstances the operation of para-

centesis is frequently followed by a cure. Even in diseased liver, after the removal of the water by the use of the medicines which we have already recommended, I have known the patient ultimately recover. Considerable pressure upon the abdomen after the operation, lessens the disposition to the return of the effusion. Before the operation of paracentesis is described, I shall speak of ovarian or encysted dropsy.

OF OVARIAN OR ENCYSTED DROPSY.

This is a bladder of water, formed within or upon the ovarium.

Symptoms.—The disease is, at first, discovered as a swelling upon the brim of the pelvis, from two to three inches above Poupart's ligament, and is confined to one side of the pelvis. It is unattended with pain, and the general health remains uninjured. Under varied positions of the body it moves, in some degree, from side to side. It is a very circumscribed swelling, and has an elastic feel; it is often accompanied in its early stages with an irritation to make water, and now and then with a difficulty in its discharge.

Progress.—As it gradually increases it rises from the lower part of the abdomen to the upper, and occupies more and more the centre of the abdomen; at length it extends over to the opposite side from that in which it began: although it is generally largest on the side in which it commenced; at first the breathing is unaffected; but when the size of the swelling is very large, the action of the diaphragm is greatly impeded by its pressure.

Fluctuation.—The fluctuation in this disease is much less distinct than in ascites; but when it acquires considerable size, it becomes proportionally more and more perceptible. It depends, however, upon the thinness of the cyst. In ascites the fluid is in direct contact with the peritoneum, on the posterior surface of the abdominal parietes; but in ovarian dropsy a cyst sometimes of considerable thickness intervenes between the water and the peritoneum.

Solid Enlargement.—The ovarium is subject to solid enlargements of very considerable bulk; and an ignorant surgeon might plunge a trocar into such a swelling, mistaking it for ovarian dropsy, which a little more attention to its want of fluctuation might have led him to discover.

At first the water which is formed in the encysted dropsy is contained, not in a single bag, but in several; the septa between which become gradually absorbed, and their number consequently diminished; and this is another reason for the fluctuation being more distinct as the disease advances. The cyst which is, at first, of considerable density, becomes thinned by a process of absorption, leading to a more distinct perception of the fluid.

Nature of the Fluid.—The fluid contained in an ovarian cyst varies much in appearance, it being sometimes watery; sometimes serous,

containing a large quantity of albumen ; sometimes mucilaginous and tenacious, so as to be ropy, but yet coagulating little under the influence of heat.

Its Colour.—The colour also varies ; sometimes being yellow like serum ; sometimes it is brown and frothy ; three times I have seen it yellow like pus, and containing similar globules. One case with Mr. Simpson, surgeon, in Lime Street Square, in which a pail-full of this fluid was drawn off ; a second in a Miss Warner, of the Kent Road ; and a third in a Mrs. R. of Chatham Place, whom I lately attended with Dr. Key.

Hydatids.—I have seen hydatids discharged with the fluid.

Quantity of Fluid.—The quantity of fluid accumulated in this disease is necessarily varying, but the proportion averages from twenty-five to thirty-two pints. The greatest increase of the ovarium which I have seen is in the collection of St. Thomas's Hospital, in which the accumulation was ninety-seven pints. The least which I have removed has been sixteen pints.

Case.—The following is the account upon a tomb-stone near Dartford, Kent. "Here lies the body of Ann Mumford, daughter of John Mumford, Esq., of Sutton Place, in this parish. Her death was occasioned by dropsy, for which, in the space of three years and ten months she was tapped one hundred and fifty-five times. She died the 14th of May, 1778, in the twenty-third year of her age, an example of patience, fortitude and resignation."

This then is a proof of extent of the secretion, and of the necessity, in some cases, for the repetition of the operation.

Situation of the Cyst.—In the collection of St. Thomas's Hospital there is a preparation showing the origin of this disease ; in one ovarium bags are formed within its tunica albuginea ; on the other side, a cyst is produced externally to the ovarium, but pendulous from it ; thus there are some cases of it internal and some external to the ovarium.

Adhesion of the Cyst.—At first the bag does not adhere to the peritoneal lining of the abdomen ; but as it becomes large, it gradually acquires such adhesion ; and, upon dissection of these cases, the cyst is found to have united itself with the parietes of the abdomen, so as to leave no space between it and the peritoneum : the intestines and omentum are situated behind it, under great accumulation.

Burst by Accident.—The ovarian cyst sometimes bursts by accident.

Case.—Miss Warner, to whose case I have already alluded, was thrown out of a one-horse chaise, and burst the ovarian cyst. She soon afterwards began to make large quantities of water, and the disease disappeared ; but in seven years it returned, and she was obliged to be tapped.

Case.—A lady with ovarian dropsy, in getting from her bed, fell against the corner of the night-chair, and ruptured the ovarian cyst, producing considerable extravasation of blood externally : her secre-

tion of urine became abundant, and her abdomen much lessened ; but the disease afterwards returned.

Medical Treatment.—With respect to the medical treatment of ovarian dropsy, I fear a difference of opinion with many other medical men, when I say, that medicine has but little influence over this complaint.

I have seen the most gentle, as well as the most drastic medicines given to promote the absorption of the fluid, but without success ; and when we consider the little vascularity of the cyst in which the water is contained, and also how little influence medicine has over common hydrocele, we shall not be inclined to expose our patients to the trial of these agents.

Case.—Dr. Baillie and myself attended a lady together, who could only hiss her answers to our questions ; and when we asked the cause, we learned that for an ovarian dropsy, of which she afterwards died, she had undergone a course of mercury, which had occasioned a sloughing from the inside of her cheeks, without relieving her dropsy : the contraction of the cicatrices in the mouth had produced the alteration in her voice.

Diet.—With regard to diet, I tried in a case of dropsy the following experiment. I tapped a woman in Spitalfields, and I ordered her afterwards not to drink, but merely to suck an orange when she was thirsty : with respect to her solid food I put her under no restraint. The next time I tapped her, I allowed her to take as much fluid as nature prompted, but she filled faster with water in the former than in the latter case ; the cause of the difference appeared to me to consist in the excitement of the kidneys which the fluids occasioned.

Pressure.—A considerable effect is produced in retarding the progress of this disease, by the patients wearing a belt, which, by its pressure, prevents the ready secretion from the exhalent extremities of the vessels into the interior of the bag. I therefore always lay my patients under the injunction to obtain and wear one.

A patient who is affected with this disease has the general health so little deranged, as not to require any change in the general mode of living ; exercise may be taken, and the same diet allowed as under ordinary circumstances.

OF THE OPERATION OF PARACENTESIS.

Not to be performed Early.—This operation ought never to be performed early in the disease, but it should be deferred until the accumulation of water by its pressure upon the diaphragm influences the function of respiration.

Reasons for Delay.—If the quantity of water in ascites be but small, much danger is to be apprehended of the trocar reaching the viscera ; and in the ovarian dropsy the operation must not be performed early, because the adhesion of the ovarian cyst to the perito-

neum on the fore part of the abdomen is not yet produced. The viscera, therefore, glide down between the cyst and the parietes ; and I once saw, in a case of ovarian dropsy, the omentum caught by the canula, and a portion of it was brought through the opening in withdrawing the instrument, which was obliged to be returned by a probe; inflammation succeeded, and the woman died. This might have been avoided by further delay ; therefore the operation should not be performed until the ovarium ceases to move easily from side to side.

A second reason for delaying the operation exists in the numerous cysts of which the tumour is first composed, which afterwards break into one ; but when the operation is performed early, the escape of water is only from a single small cyst.

Before performing the operation in the encysted dropsy, as the fluctuation is much less distinct than in ascites, the greatest care is required to prevent an error.

I will here mention two circumstances, in one of which my character was exposed to considerable risk ; of the other, I was informed by a medical man who was invited to witness the operation.

Case.—In the first case, I was desired to see a lady who I was told laboured under dropsy. When I entered the room, I saw a tall delicate female with an immense abdominal swelling, giving a distinct sense of fluctuation. I requested the physician accoucheur whom I met, to examine if the lady was not with child ; he said, he thought it was unnecessary, as the fluctuation was very distinct, but that he would do so, and let me know the result in a few days. I heard no more of her for a week, and then I learned that she had been put to bed on the morning following my visit. I would not have performed the operation of paracentesis for the universe.

Anecdote.—The circumstances which were told me of the other case were as follow : A surgeon in a country town called upon another surgeon, and said, “ I am going to tap a woman to-morrow ; perhaps your young gentlemen would like to be present.” As it was an operation they had never witnessed, they most readily accepted the invitation ; they were shown into a room in which the patient was already prepared to undergo the operation, she sitting at one end, with her abdomen bare. The surgeon then, taking his trocar and canula, went to some distance, and walking up to the patient with the trocar presented, he charged, as it were with a bayonet, and plunged it into the abdomen ; then withdrawing the trocar with an air of triumph, it was with no small chagrin he found not a drop of water escape ; but however, still undismayed, he withdrew the canula, and again renewing his attack, he a second time introduced the trocar into the abdomen ; but was equally unfortunate as before, in finding that no water followed. Waiting a few moments, he withdrew the canula, and turning round to the gentlemen, he said, “ You may do her up ;” by which he meant, they might apply the bandages ; and he added, “ This, gentlemen is an operation which you probably never saw before, and

which most likely you may never see again. This is what we call the operation of dry tapping."

Before performing this operation, the patient should be placed upon an elevated seat with the abdomen bare, a sheet is to be doubled to about a foot in breadth, and is to be passed around the body at the upper part of the abdomen, and the ends being crossed at the back, are to be held by assistants; but instead of doing this, I frequently suffer my patient to remain in the horizontal posture in bed, turning only to the side; by this plan, that faintness is prevented, which usually attends the escape of the water if the patient be in the sitting position; a pail is required to catch the water in the first instance, and a basin afterwards. The necessary instruments are a trocar and canula, or a lancet, with a canula shut at its end like a catheter, and with holes on its sides equal in diameter to the canal of the canula.

A long Trocar necessary in Ovarian Dropsy.—If it be ovarian dropsy, and the cyst possess considerable thickness, it is very desirable that the surgeon should be provided with a trocar and canula of an inch more than the usual length, as I once operated upon a patient of Dr. de Vallangin, in whom I was obliged to employ a much longer trocar and canula, being unable to reach the cavity of the cyst with an instrument of the common length.

The proper Spot for the Introduction of the Trocar.—The place at which the operation is performed was changed by Mr. Cline from midway between the umbilicus and anterior superior spinous process of the ilium on the left side to one inch below the umbilicus; and his reason for this change was, that in the spread of the abdominal muscles from the pressure of the water, the epigastric artery is brought into a situation of risk of being wounded by the trocar, a circumstance which did happen to Mr. Cline. He was tapping a person in St. Thomas's Hospital, and he saw florid blood issue through the canula; the quantity gradually increased as the water flowed; and as the patient was becoming faint, he withdrew the canula and closed the wound, but the bleeding continued into the abdomen, and the man died; upon inspection, the epigastric artery was found wounded.

Reflecting upon this circumstance, he was led to consider, that an inch below the umbilicus in the linea alba would be the safest spot for the introduction of the trocar, as no vessel would be there endangered, and it was only required that the bladder should be previously emptied. This part has been therefore of late years usually selected for the operation.

Danger of Operating at the Umbilicus.—Some have recommended the umbilicus, but the frequency of hernia renders that spot unsafe. An inch above the umbilicus has been also advised; but if there be hernia, it is equally dangerous with the umbilicus itself; and if the umbilical vein remain unclosed, there is a danger of hæmorrhage in performing the operation at that part.

Besides the danger to the epigastric artery in the operation per-

formed at the part formerly selected, there was danger of wounding the spleen when it had become enlarged.

Operation.—The surgeon should place himself on a low stool by the side of the patient; the sheet is then tightly drawn by the assistant across the upper part of the abdomen, by which its lower part is rendered prominent, and the point of the trocar is placed an inch below the umbilicus, and is passed slowly and gently through the linea alba; the trocar is then withdrawn, and the canula being left in, the water is allowed to escape through it. If any interruption to the passage of the fluid by the pressure of the omentum, or of the mesentery on the end of the canula arise, a probe should be gently passed through the interior of the canula to remove the obstruction.

Canula left in the Wound.—It has been recommended by Mr. Guy of Chichester, and others, to leave the canula in the wound, occasionally to suffer the water to flow, and thus prevent its future accumulation.

Sometimes produces a Cure.—A slight inflammation of the peritoneum in these cases sometimes succeeds the operation; and by the change of action thus excited in the vessels, its disposition to a future secretion is lessened, and in this way a cure is produced.

Pressure.—Immediately after the operation has been performed, a belt is to be tightly applied around the abdomen, to prevent the re-accumulation of water by lessening the determination of blood to the parts.

Operation rarely Successful.—The result of the operation is generally unsuccessful in ascites, as the greater number of cases are accompanied with organic disease: the operation only acts upon the effects, and not upon the cause, and the hope of permanent advantage must be derived from medical treatment, and not from surgical operation; but the removal of the water gives additional facility to the operation of the medical means which are employed.

With respect to the ovarian dropsy, the operation is the only means of relief; but it generally fails in producing a permanent cure.

In ascites forming after fever, and after a course of mercury, and in ascites unaccompanied by organic disease, I have known the operation succeed in producing a permanent cure. In ovarian dropsy, the instances of permanent cure from operation are exceedingly rare.

The case which I have given from the neighbourhood of Dartford shows the number of times this operation may be repeated.

In the very young and in the very old, I have known the operation succeed.

Spontaneous Cure of Ovarian Dropsy.—Of a spontaneous cure of ovarian dropsy I have known several examples.

Case.—The wife of a veterinary surgeon had an opening at the umbilicus produced by ulceration, through which large quantities of fluid were for a length of time discharged; but the opening ultimately closed, and the disease did not return.

I have known the water discharged by the Fallopian tube; and I attended a lady in whom an ovarian cyst burst into the intestinal canal;

for several years afterwards she was subject to occasional returns of the disease, but ultimately recovered.

I have known a person die from suppuration of an ovarian cyst.

Injection of the Cyst.—The injection of an ovarian cyst has been occasionally practised with success; but it has also failed; so that its salutary influence remains in doubt.

Removal of the Cyst.—The removal of an ovarian cyst from the abdomen might be performed in the early stages of the disease by making an opening into it, discharging its contents, and by dividing the membranous bag from its natural adhesions.

OF PARACENTESIS OF THE THORAX.

When required.—This is required for accumulations of matter within the cavities of the pleuræ, or matter partially encysted in those cavities. With respect to a collection of water in the thorax, I have only once known an operation performed for it, which proved unsuccessful; the effusion of serum being only the effect of some more formidable disease.

OF EMPYEMA.

Causes.—Collections of pus in the chest are the result of inflammation of the pleura, or of the pericardium; but as the latter does not admit of relief, I shall only describe the former.

Symptoms.—The formation of matter in the cavity of the pleura is preceded by the usual symptoms of pleuritis—viz., pain in the side, cough, a hurried breathing, and imperfect expansion of the thorax; these are succeeded by rigors and greater dyspnœa, by a frequent, small, and often irregular pulse; and if the disease be confined to one side, the patient can only rest on one side. When the sides of the thorax are accurately compared, the diseased is found to be considerably larger than the sound side; the upper part of the abdomen is also much fuller on the side affected; a tense and elastic swelling may be felt there, varying with the state of respiration.

A swelling of the legs succeeds from the pressure of the accumulated fluid affecting the free circulation of the blood through the lungs, as well as altering the position of the heart.

Spontaneous Cure.—Nature occasionally performs a cure, in the following manner: The intercostal muscles give way to the pressure of the matter, or an ulcerative process is produced, by which the pus escapes to the outer side of the ribs under the integument, which at last also ulcerates, and thus the matter becomes discharged.

Case.—I was sent for to Miss B——, in Chatham Place, Blackfriars, to meet her medical attendant, Mr. Murley, on account of her being under the following circumstances. She had great dyspnœa, severe

cough, a quick small pulse, great emaciation, and hectic flushes, succeeded by rigors. When I examined her left side, I found a large swelling in the situation of the spleen, and another, about the size of a walnut, between the third and fourth ribs; when I pressed upon the tumour in the situation of the spleen, that between the third and fourth ribs became enlarged, so that there was evidently a fluid fluctuating between the two swellings. Thus I found that the enlargement on the left side of the abdomen was occasioned by a descent of the diaphragm from accumulation of fluid in the chest, and I did not hesitate to advise that an opening should be made into the small and circumscribed swelling between the ribs.

This being done, an immense flow of matter immediately succeeded; and when the swelling in the region of the spleen was pressed the flow increased. After a very long-continued and copious discharge, this young lady recovered, and now enjoys good health.

Case.—I attended a young lady in Seymour Street under exactly similar circumstances, and she also recovered from the same plan of treatment. These abscesses would of themselves soon have burst, but I thought it better to save the constitution by aiding the efforts of nature.

The Pus does not always point Externally.—It frequently happens, however, that the accumulation of pus in the thorax is not accompanied by a partial swelling between the ribs, and under these circumstances the surgeon must be guided in his judgment by the symptoms I have described. In this case, it will be required to make an incision into the thorax without any well marked circumstance in the disease, to direct the situation of the opening. The surgeon will then consider in what place the wound will be the most dependent, so that the matter may readily escape.

Operation.—As the patient should be in the sitting position at the time of the operation, the lower part of the chest should be selected between the seventh and eighth, or eighth and ninth ribs, and the opening should be made rather posteriorly to the side of the thorax, so as to completely avoid the diaphragm. The skin being drawn up an inch, an incision is to be made through it upon the upper edge of the rib; after which, the intercostal muscles are carefully divided; and a straight canula closed at its end like a catheter, but having holes in its sides, is then passed through the pleura, and the pus is allowed to escape through it. When the matter has been thus evacuated, the canula is removed, and the skin being let go, the external and internal wounds are no longer opposite to each other, and union is more readily effected.

The reason for making the incision upon the upper edge of the rib is to avoid the intercostal artery, which is placed in a groove in its lower margin.

Sometimes succeeds.—This operation I have known succeed, although it is generally unsuccessful.

Case.—A Mr. Bryant, in the city of London, had this operation performed upon him, by Sir B. Harwood, and he ultimately recovered.

Spurious Empyema.—Collections of pus in the thorax are sometimes partial, and then the disease is called spurious empyema.

How produced.—An adhesion forms between the pulmonary and costal portions of the pleura, between which also matter becomes deposited, so that the general cavity of the chest is excluded from the accumulation. This abscess ulcerates the intercostal muscles, and breaks externally, after having been the occasion of excessive pain, dyspnœa, and cough.

Case.—A boy, who had been a long time at sea, and who had been very much the subject of sea-scurvy, was sent to my house by his mother, on account of a large accumulation of matter upon the left side of his thorax, a part of which passed to and fro between the ribs, and projected very much if he made a deep inspiration, or coughed. Seeing him in ill health, I was fearful of making an opening, but advised him, on account of his scurvy, to take bark with sulphuric acid; under the improvement of his general health which this treatment effected, the matter became entirely absorbed, and the boy perfectly recovered.

Treatment.—The treatment of spurious empyema is that of common abscess, viz., fomentations and poultices; and the opening is to be left to nature or performed by art, as the constitution is able or unable to bear the process of ulceration.

LECTURE XXIX.

OF HARE-LIP.

Definition —THIS is a congenital fissure in the upper lip, which resembles the form of the lip of the hare.

Many Varieties.—But the deficiency of the lip and palate is liable to great varieties.

Simple Fissure.—1st, It is frequently a simple fissure, extending from the edge of the lip nearly to the nostrils.

Entering the Nostril.—2dly, It is sometimes more extensive, and is accompanied with greater separation, when it enters the nostril.

Double Fissure.—3dly, The defect occasionally exists on each side and extends into both nostril.

Extending through the Bone.—4thly, The fissure is not confined to the lip, but extends into the superior maxillary bone, and sometimes along the whole of the superior maxillary and palate bones, and through the velum palati.

Double Fissure extending through the Bone—5thly, A fissure is sometimes seen opposite each defect in the lip, which extends through

the maxillary and palate bones, leaving an insulated portion of each of these bones in the centre.

Fissure only in the Palate.—6thly, The defect in the palate is in some cases a circular opening, either in the bone or in the velum palati only.

Cause.—As to the cause of this defect, it may be remarked that such deficiencies are more frequently observed in the median line of the body than in any other parts. The body is constituted in the greater part of two halves rather than of one whole; thus it is obvious, that the brain and nervous system on one side of the body is distinct in its functions from the other side; as for example, in cases of paralysis the nervous defect is confined often to one half of the body.

I have seen a child born with half its face; its arm and leg on one side much larger than on the other.

With regard to the organs of sense, they are each of them double. In the organs of smell and taste, although less apparently double than those of sight, hearing, or feeling, yet the function of one half of the tongue and one half of the nose may be lost, and the other half remain perfect.

It is at the median line that the union of the two halves of the body may be said to be produced: there it is that the nerves unite, and the blood-vessels inosculate; and from deficiency in that inosculation arise the defects which are so frequent in the central line of the body, viz., the defects in the lip and in the palate; a want of the sternum; a deficiency of the linea alba to a great extent; also of integument, pyramidal muscles, and fore part of the bladder; the prepuce imperfectly formed at the frænum; an aperture in perineo in the male giving the appearance of the hermaphrodite.

Exceptions.—The exception to this rule is in the abdominal viscera, which are supplied by azygos branches from the aorta and by nerves from the ganglia.

Contrary Effects.—On the other hand, the inosculation in some instances is unusually free, producing a closure of the anus, or of the pudendum in the female.

Fissure in the Lip easily cured.—The congenital defect in the lip may be readily repaired by the process of adhesion, and this becomes desirable not only on account of the disgusting deformity which it produces, but also from its influence upon the nourishment of the child, its food returning by the unnatural aperture in the attempt to swallow it. The edges of the fissure in the lip are therefore pared away, the raw surfaces are preserved in complete contact, inflammation arises, adhesive matter is effused, and vessels shooting into the adhesion produce a living union of the parts.

Proper Age for an Operation.—It becomes a question of importance, at what period of life the operation should be performed, whether immediately after birth, at from three to six months of infancy, or after dentition is completed.

It is undoubtedly true that adhesion is most sure to be lasting after the period of dentition, and that this operation, therefore, scarcely ever

fails when performed between two years and the adult age; on the contrary, during dentition it is attended with some danger, and sometimes the adhesion is destroyed by the violent efforts of the child; soon after birth the operation often fails, and is attended with considerable danger.

Of the proof of the danger during the period of dentition, I will mention the following case. A child of a clergyman, of more than six months of age, was sent to me from the country to be submitted to this operation. I advised that it should not be performed, but the answer was that the mother could not bear to see the child with this deformity. I operated; the child became feverish, the gums inflamed, and an incisor tooth partially made its appearance; the child was attacked with purging of the most severe kind; and, on the fifth day following the operation, it died.

Danger soon after Birth.—The danger, however, is much greater if the operation be performed soon after birth; the nervous system is then so exceedingly irritable, that convulsions are readily produced, and the loss of a small quantity of blood occasions a fatal influence.

Case.—I was operating, at Great Yarmouth, upon an infant with hare-lip in the presence of Dr. Girdlestone, when he said, "Have you no fears of the child's dying?" to which I replied, "I never saw one die from this operation;" he told me that he had witnessed an operation upon a child, which was soon after seized with convulsions, and of those convulsions it died.

Case.—I was requested by Mr. Price, surgeon, in Tower Street, to see a child, born the preceding day with hare-lip. I performed the operation, the infant lost but little blood; on the following day, when I called upon Mr. Price to accompany him to visit the child, he informed me that it was just dead, and that it had lived only twenty hours after the operation.

Case.—An infant was brought to my house in Broad Street with hare-lip. I operated upon it upon a Monday, and desired that it might be brought to me upon the Thursday; the mother called upon the Thursday to inform me that the child was dead.

Case.—During the year 1824 an infant was brought to my house, with a hare-lip of the most simple kind, and its parents were determined to have the operation performed: this was done upon a Monday morning; on the Tuesday the father of the child came to my house, and said, "Sir, my child vomited very much last night, and is this morning in a state of stupor." I directed him to give the infant some calomel, and put it in the warm bath; I called at the house in the evening, when I found that the child was dead.

Thus the danger at the infantile period is considerable, and the operation also often fails when the life of the patient is not endangered. I operated, in the presence of Mr. Cline, upon an infant, the daughter of the marshal of the King's Bench, but the lip flew open when the ligatures were removed.

Case.—I was requested to perform this operation upon a boy about

twelve years of age, who had been operated upon in his infancy by one of the first surgeons in the city of London, yet the union had been so imperfect that a second operation was demanded.

Practical Conclusions.—The conclusions, therefore, as far as my own experience dictates, are these: That prior to six months there is danger of a want of union, and even of the loss of life; that from six months to two years, during the period of dentition, the operation should not be performed: that, after dentition is completed, there is little risk of failure either as regards the union of the lip, or the life of the child.

Sometimes an early Operation beneficial.—Notwithstanding I feel it my duty to mention these adverse circumstances, yet I have known the operation performed, and have performed it myself in infancy, with very complete success; and in those cases in which a fissure has existed in the upper jaw, the union of the upper lip has, by its pressure upon the bone, led to an approximation of the edges of the fissure so as to produce considerable advantage by the early operation.

Two Modes of operating.—The operation may be performed with a simple interrupted suture or with pins. Mr. Cline, who had great experience in his profession, preferred, and in his lectures recommended, the former. The truth is, that it may be very successfully performed with either; but the interrupted suture is the most simple, and, as far as I have seen, equally effectual: it has this great advantage, that it prevents the disturbance to the adhesion, which the lip receives in the removal of the pins.

Operation.—The steps of the operation are as follows: The child is to be recumbent with its head placed over a pillow, the surgeon then extends the lip from the nose, and if any adhesion to the gum prevents its being extended, such adhesion must first be divided; he next introduces a pointed and curved bistoury, at the angle of the fissure, carries it down to the red edge of the lip, and thus removes the surface from one of the sides; the removal of the opposite surface is effected from the angle of the fissure in the same way. A straight needle armed with a waxed silk is afterwards passed through each side of the lip, at the juncture of the skin with the red part, and about the eighth of an inch from the raw surface; then another needle and ligature being introduced through the integument, half way between the first suture and the angle of the fissure, the edges of the fissure are brought together by tying the portions of silk, the lower one should be secured first; and when both are tied, the ends of the silk are to be cut off above the knots, and thus the operation is concluded. There is not any necessity for applying adhesive plaster; and the more the part is exposed to the air, and the more dry it is kept, the better. The coronary artery of the lip bleeds freely in the operation, but it ought not to have a ligature applied upon it, as when the sutures are tightened the orifices of the artery become sufficiently compressed to prevent hæmorrhage.

Removal of the Sutures.—The general rule for the removal of the sutures is on the fourth and fifth days. On the fourth day take away

the upper thread, and upon the fifth day the inferior one ; but although this is the general rule, yet if there be much inflammation or tendency to suppurate about the sutures, both should be removed on the fourth day.

After-treatment.—After the removal of the sutures, it is best not to apply any plaster unless the adhesion be incomplete at any part, and then a very narrow and long strap may be carried from cheek to cheek across the lip.

Caution in giving Food.—In giving the child food after the operation, it should be done in such a manner as not to disturb or moisten the lip.

Mode of using Pins.—If pins are employed, they are to be introduced at the same part of the lip as the sutures, and then the ligatures are to be twisted over their ends in the figure of an ∞ . The pins should be of silver or gold with steel points, which points admit of easy removal : great care is required when taking away the silk and pins, that the adhesions may not be disturbed ; this is to be done at the same period after the operation, as when sutures are used.

Fissure in the Bone.—A fissure in the bone accompanying that in the lip, makes no difference in the mode of performing the operation, but renders its success more doubtful, from the want of support by bone which the lip would otherwise receive. In general also, in this case, the fissure in the lip extends into the nostril, and it requires great care on the part of the surgeon to produce a union of the upper part of the fissure without deformity.

OF THE DOUBLE HARE-LIP.

Two Fissures in the Lip.—If there be a fissure on each side extending through the lip, without any imperfection in the bone, the operation is performed in the same manner as when the fissure is confined to one side, but at successive and distant periods, so as to allow time for the complete adhesion and union of one side, before the second operation be attempted.

Extending through the Bone.—A fissure in the bone sometimes accompanies each fissure of the lip, and then a projection of the insulated portion of bone occurs, in some instances almost to the extremity of the nose.

Operation.—The operation may be then performed by removing, or not removing, the projecting bone. I have successfully removed the projecting portion of bone, uniting the lip at a future period ; but there was this objection to the mode of relief, that the upper lip did not project as usual from the want of that portion of the jaw and teeth, and an artificial jaw was required to form a support : it is better, therefore, to perform the operation upon each fissure of the lip, by uniting the skin upon each side, to that which remains upon the projecting bone, and to depend upon the modelling process of growth for the

gradual diminution of the projection ; the operation being the same as that which is necessary for the simple fissure. After the union of the lip, the diminution of the bony projection may be assisted by gentle pressure.

DEFICIENCY OF THE PALATE.

Inconvenience of.—When there is an aperture in the bony palate, the person suffers a twofold inconvenience : 1st, In a nasal pronunciation ; 2dly, In the passing of the food, particularly liquid, into the nose.

Two Modes of Relief.—If the opening be confined to the bony palate, there are two modes of relief, one by the patient's wearing an artificial palate, the other by operation.

Artificial Palates.—The most simple of the artificial palates was made for me by Mr. Wiess in the Strand, which consisted of two plates of silver connected together in the centres by an axis, so that the one could be turned upon the other by means of a key ; thus when introduced, it could be easily fixed. Mr. Wiess showed me one of the same form, of elastic gum. A plate of silver, with two springs which passed through its centre, so as to expand when pushed up, would answer the same purpose. The common contrivance is a piece of silver, and a sponge connected to it by a chain or stem ; the sponge being passed into the nose through the aperture in the palate, there expands by the moisture, and fixes the silver plate against the opening, but the animal fluids in the sponge soon become putrescent, and render the breath extremely offensive.

A portion of membrane from the roof of the mouth might be partially pared off, and turned over the opening, its circumference being placed in contact with the edges of the aperture so as to produce adhesion ; but of this operation I have not any experience.

For a circular deficiency in the velum palati, an artificial palate of elastic gum will answer best.

Operation for Division of the soft Palate.—An operation similar to that for hare-lip, has been performed for a congenital division of the soft palate. Mr. Cruickshank tried it and failed ; Mr. Roux of Paris, and Mr. Alcock of London, have since been successful.

CANCER LABII.

Its Commencement.—This disease wears two different appearances in its commencement. It sometimes assumes the character of a warty excrescence, at others, it is an ulcerated fissure in the lip attended with surrounding hardness.

At first begins in a Wart.—When it is at first a wart it is covered by an incrustation, upon removing which an elevated and ulcerated surface is exposed with surrounding hardness. A fresh incrustation

forms, additional growth takes place in some parts, and ulceration in others, until at length a considerable projection is produced. When the incrustation is now removed, the surface freely bleeds, luxuriant granulations appear in some parts and deep depression in others. It extends more upon the red part of the lip than upon the surrounding skin, though ultimately the latter becomes affected. It is very little tender to the touch, so that the patient handles it with great freedom ; but it is occasionally accompanied with darting pains.

At first begins as a Fissure.—When it begins as an ulcerated fissure in the lip the surrounding part is hard, an incrustation is afterwards produced, and ultimately the disease has very much the same appearance as when it begins as a wart. It gradually ulcerates the skin towards the chin, and although beginning in a small spot at length involves the whole lip.

Character of the Sore.—The character of the sore is that of a cancerous ulcer, its edges being everted, and its surface hard ; a gland under the jaw next becomes affected between the symphysis and angle, and sometimes the glands on both sides : the gland is hard and at first not painful, then the surface assumes a livid appearance and becomes occasionally acutely painful ; at length it ulcerates, discharges a bloody serum, bleeds frequently, the edges of the ulcer are everted, the ulceration becomes extensive, and the surface of the sore very irregular ; several other glands in the neck become affected, difficulty of breathing and of deglutition ensue, and the patient falls a victim to the disease after a long period of suffering.

Its Cancerous Characters.—Some persons deny that the character of this sore is cancerous, but upon what principle I cannot understand, for it is unequal upon its surface, it has irregular, callous, and everted edges, it is accompanied with lancinating pains, it extends its influence to the neighbouring absorbent glands, and when a section is made of it after its removal its internal appearance is truly scirrhus.

Rare in the Upper Lip.—I have seen at least two hundred cases of this disease in the under lip, and have only witnessed one in the upper. It is a very rare disease in the female ; it is a complaint of age more than of youth, occurring most frequently from fifty to seventy years.

Supposed Cause.—A great many of the persons in whom I have seen this disease have attributed it to the custom of smoking, believing that the tobacco pipe was instrumental in its production ; but I have frequently seen it in persons in whom it could not be attributed to that cause. It seems to be much more a local disease than cancer in most other parts of the body ; the general health often appearing extremely good.

OF ITS TREATMENT.

Escharotics.—In the early stages of this disease the sore may be destroyed by the application of arsenic, which occasions it to slough ;

it might be also destroyed by the actual cautery, but in the very earliest stages it is most prudent and judicious to remove it by the knife.

Removal by the Knife.—The operation should not however be performed if a gland under the jaw be enlarged, as the disease is then sure to return ; but if the gland be not diseased, the result of the operation is much more successful than for scirrhus tubercle in the breast.

Medicine Useless.—No local applications short of those that destroy the part, or any form of internal medicines, are found to be useful.

Operation.—The operation is performed in the following manner : An assistant puts a finger into each angle of the mouth, and stretches the under lip to its utmost extent ; the surgeon then makes an incision on each side of the disease, so that a triangular portion of the lip is thus removed.

Hæmorrhage.—The coronary arteries bleed freely, but do not require to be secured ; but when the inferior labial artery is formed on each side, by a large mental branch, I have found it necessary to secure that vessel at the inferior angle of the incision.

Sutures.—Three ligatures are then required to bring the edges of the wound together ; one at the red edge of the lip, and two others at equal distances, in the remaining part of the wound. These are to be passed through the lip by means of a straight needle, as in the operation for hare-lip. Some pressure is afterwards required, to assist in the arrest of the bleeding from the coronary arteries ; the patient using a sponge for that purpose.

Two-thirds at least may be thus removed, and yet a good lip be afterwards formed. The ligatures are to be removed on the fourth and fifth days, the upper ligature being left to the fifth day.

It is a folly in this operation not to encroach upon the sound rather than upon the diseased part.

OF THE OPERATION FOR TIC-DOULOUREUX.

Nature of the Morbid Change not known.—Of the nature of that change in the nerve which produces this disease I have no knowledge, as I have never had an opportunity of dissecting a nerve which had been affected with it.

Appears to be an Action under par.—To me it has always appeared, that it is an action under par, rather than an inflammatory action on the nerve, and for this obvious reason, that the remedies found successful in it are those of a tonic kind : large doses of bark, the free administration of arsenic, but above all, the remedy recommended by Mr. Hutchinson of large doses of steel, are the evidences in support of this opinion.—Opium, belladonna, and other narcotics, have only a temporary influence in mitigating suffering. As local applications, I have known belladonna, and an ointment of the subacetate of lead, beneficial.

Sometimes originates in the Brain.—But this disease sometimes appears to originate in the brain itself, as I have understood was the case in my friend Dr. Pemberton, who suffered more from this dis-

ease than any individual I have ever witnessed, and in whom a portion of bone was found growing on the brain.*

Division of the Nerve.—The operation of dividing the nerve for this disease is sometimes anxiously called for by the patient, on account of his agonizing sufferings; I have seen an old weather-beaten captain of a man of war cry like a child under the painful influence of this disease; and a female once said to me, after the division of the nerve, “Sir, the operating table was a bed of roses in comparison with the agony which the complaint had produced.”

The Nerves commonly divided.—The nerves which I have divided, have been the suborbital, the frontal branches of the ophthalmic, the mental nerve, and the portio dura of the seventh pair, which is perhaps more frequently the seat of this disease than any other nerve in the body.

Operation very simple.—The operation is extremely simple, and is performed in the following manner upon the suborbital nerve. The ridge at the lower part of the orbit being felt, the foramen through which the nerve passes is situated from a quarter to half an inch below the centre of that ridge. The point of a curved bistoury is then passed into the cheek three quarters of an inch below the ridge of the orbit, and to the outer side of the foramen, and is carried directly to the bone; then passing it upon the surface of the bone under the nerve, and little obliquely upward towards the inner canthus of the eye, the point of the knife is brought to the back of the skin at the distance of an inch from where it entered; it is then kept elevated against the back of the skin as it is withdrawn, and the nerve is thus freely divided by an opening through the skin, not above half the size of that which is made in bleeding.

* In the autumn of last year I was requested to attend a gentleman from Lancashire, on account of his suffering severely from a constant pain on the right side of his face, seated principally in the branches of the second and third divisions of the fifth pair of cerebral nerves. The complaint had existed for several months previously, and the pain was occasionally so acute, that his friends thought he would become insane. He took, at separate periods, mercury, arsenic, steel, bark, sulphate of quinine, opium, and various other narcotics, but without their producing much mitigation of suffering. The vinum colchici was the only medicine from which he experienced much relief, but it produced so great a derangement of the digestive organs (although taken in conjunction with other remedies,) that it could not be administered but at intervals.

He died in the early part of February last, extremely emaciated, and completely worn out, by the almost constant and severe suffering. His mental faculties appeared perfect to within a few moments of his death, which took place on his making an effort to stand, when assisted out of his bed. On examining his head after death, I found two fungoid tumours originating from the dura mater; one situated on the right side of the sella tursica, and connected with all the branches of the fifth pair of nerves, but particularly the second and third; the other was placed over the cuneiform process of the occipital bone, was of the size of half a large hen's egg, and was connected with the other tumour by a process of the same fungoid matter, which extended over the extremity of the petrous portion of the right temporal bone. The smaller tumour was about the size of a nut. The pons varolii and medulla oblongata, which were much displaced by the diseased mass, appeared softer than natural, at the part immediately over the larger tumour.—T.

Pressure with the finger is for a few minutes required, to stop the bleeding from the suborbitary artery.

Division of the Frontal Branches.—The operation upon the frontal branches of the ophthalmic is performed in a similar manner ; as these branches radiate more at the upper part of the orbit, it is necessary to make the division a little more extensively than in the former case.

The eyebrow is drawn up, and the point of the curved bistoury introduced under it on to the ridge of the orbit, to the outer side ; and being carried inwards close to the bone towards the upper part of the nose, the point is elevated to the skin, and withdrawn close to the back of it, out of the opening by which it was introduced, by which all the branches are divided.

Division of the Mental Nerve.—The operation upon the mental nerve is different to the two former ; the foramen in the side of the lower jaw, through which this nerve passes, is situated in a line drawn below and between the two bicuspides ; and the pain of the disease of the nerve is felt in the under lip, and the lower part of the side of the face.

In this case, to divide the nerve, the under lip is drawn from the gum, and the point of the curved bistoury is introduced through the skin of the mouth close to the jaw, on the fore part of the foramen, and is then carried backwards close to the bone, dividing the skin of the mouth and the nerve as it passes out of the foramen, the incision being about three quarters of an inch in length ; pressure is afterwards required for a short time over the foramen to stop the hæmorrhage from the artery which accompanies the nerve.

Division of the Portio Dura.—I have only once divided the portio dura of the seventh pair of nerves for this disease. I laid bare the branches of this nerve anteriorly to the parotid gland, carefully avoiding its duct, and passing a director under the nerves, divided many of the branches, paralyzing that side of the face, the mouth being drawn over to the opposite side ; a few days after the operation erysipelatous inflammation succeeded, with a very high degree of fever, of which this woman died.

Operation seldom succeeds.—In the various operations which I have performed for this complaint, I recollect but two cases in which the operation completely succeeded.

Affords temporary Relief.—For three or four months the patient is relieved from suffering, but then the disease returns ; and it is curious, that it is reproduced whilst the numbness of the lip consequent upon the operation still remains. I have divided the nerve a second and a third time whilst the numbness was remaining in the lip, produced by a preceding operation.

Removal of a Portion of the Nerve.—It has been said, that removing a portion of the nerve prevents the pain from returning ; but a person who had submitted to this operation informed me, that he had caustic applied upon the extremities of the divided nerve, yet he consulted me for the returning disease.

With respect to the operation for the disease, it ought to be performed rather at the earnest desire of the patient than by recommendation of the surgeon.

AURA EPILEPTICA.

Case.—For this disease, I have only once had occasion to perform an operation. The case was sent to Guy's Hospital by Mr. Masters, surgeon at Watford. The man had received a severe blow on his thumb, after which he had the following symptoms, which had lasted for several months: uneasiness in the parts; pain extending up the arm in the course of the radial nerve; also to that side of the neck, accompanied by a rotatory motion of the arm inwards; occasional loss of sense and volition, so as to occasion him to fall, but without any struggle; he remained insensible for a few minutes and then recovered, excepting that the attack left some pain in his head. As the man had recourse ineffectually to a great variety of internal remedies and to electricity, I recommended him to submit to the division of the nerve, and making an incision upon the outer side of the radius, opposite to the insertion of the supinator radii longus, I laid bare the nerve, and putting a director under it, I removed a portion, which measured, after its removal, five eighths of an inch. The man had some slight attacks of the complaint afterwards, but on his return to Watford Mr. Masters informed me that he entirely recovered.



LECTURE XXX.

ON AMPUTATION.

Less frequent than formerly.—THE removal of constituent parts of the body becomes necessary from different causes, but such operations are much less frequently performed at present than they were thirty years ago.

Improved Treatment of Compound Fractures and Dislocations.—The improved treatment of compound fractures renders it rarely necessary to amputate a limb for those accidents. A compound dislocation of a large joint, a few years back, led the surgeon to condemn the limb to amputation, but it is now no longer generally believed to require it. There will, however, be cases in which an operation will be occasionally required for one of these accidents.

Of Aneurisms and Diseases of Joints.—An aneurism in a limb, for which, forty years ago, amputation of the limb was frequently

performed, is now, by the simple operation invented by Mr. Hunter, readily and effectually cured. The simple chronic and scrofulous enlargements of joints were formerly often deemed to require the operation of amputation, but rest, external irritation, alterative medicines, and a nutritious diet, now generally do away with the necessity of having recourse to so direful an expedient.

Of Ulcers and Diseased Bone.—Extensive ulceration of a limb is now much more frequently cured than formerly. The treatment of the diseases of bones is much better understood, and the result, although tedious, is rarely unsuccessful.

Natural Separation of Parts.—In gangrene, considerable portions of the feet, or of other parts, will separate by the efforts of nature, often producing as perfect a cure as the surgeon is able to effect by operation.

Operation sometimes necessary.—Amputation will still be occasionally necessary for the accidents and diseases I have mentioned: for laceration of limbs from machines; for the effects produced by the bursting of fire-arms; for some cases of gun-shot wounds; for chronic and scrofulous complaints, and for malignant diseases of a cancerous or fungoid nature; also for deformities which are either congenital or the result of organic change, and for exuberant growths, as tumours.

All that I wish to advance upon the subject is, that although the necessity for this operation still exists, that the number of amputations thirty years ago was much greater than of those of the present day.

Much less Dangerous than formerly.—Amputation is not only much less frequent than formerly, but it is an operation of infinitely less danger. The extensive surface of wound left after the old operation, and filling the wound with charpie or flour, led to the highest degree of constitutional irritation; whilst now, the integument being brought over the wounded surface, directly produces a process of adhesion, by which the constitutional disturbance becomes lessened, and the danger from the operation greatly diminished.

I shall now proceed to describe the various amputations which are required at different parts of the limbs.

The common amputating instruments are so well known, that I need not enter into any particular description of them, but I shall mention those proper to be used in each operation, when I give an account of the mode of performing it.

Application of the Tourniquet.—Of the various tourniquets, I prefer that of Petit, which is generally employed at the Borough Hospitals. In applying the tourniquet, the pad should be placed immediately under the plate to which the screw is fixed, by which the screw is made to act more effectually on the pad. That part of the limb upon which the tourniquet is to be placed should be first surrounded by a piece of soft linen to prevent the tape, when tightened, from cutting the integument. In the thigh it should be placed a little above the middle, where the artery passes nearest to the bone; and in

the arm, one-third of the length of the os humeri from its head on the inner side of the biceps.

Artery compressed without the Aid of a Tourniquet.—When amputation is required at the upper part of the thigh, the termination of the external iliac artery in the femoral is to be compressed upon the edge of the pubes, by an assistant, who puts one of his thumbs over the vessel, and the other thumb upon the first, which is our usual mode. If the amputation be performed high in the arm, the assistant is either to press the axillary artery with his fingers against the head of the os humeri, or else the subclavian upon the first rib, by means of the ring of a key or a pad, passed behind the clavicle.

OF AMPUTATION OF THE FINGERS.

In removing a portion of a finger at the second or third joints, the operation is, I think, best performed in the following manner:

Instrument.—The only instrument required is a common pointed scalpel.

Operation.—The finger being extended, the integument is cut through by a circular incision about half an inch beyond the joint, and a lateral incision is to be made on each side in the direction of the lateral ligaments, extending from over the joint to the circular cut; the portions of integument are to be raised from the flexor and extensor tendons below and above as far as the joint, making two flaps; after which the tendons and one of the lateral ligaments are to be divided, when the joint may be easily dislocated, and the separation of the part readily completed.

Vessels.—The vessels divided in this operation seldom require the application of a ligature, the pressure from the dressings being usually sufficient to prevent any hæmorrhage.

Dressings.—The flaps of the integument should be brought together, and kept so, by a narrow slip or two of adhesive plaster passed over the extremity from the dorsal to the palmar part, and these strips should be secured by a circular portion above the stump. The hand and fore-arm should be supported by a sling until the stump has healed.

Another Mode of operating.—The operation of amputation may be performed at either of these joints, by making a single flap from the palmar part. In doing this the joint must be flexed, when the scalpel is carried through the integument on the dorsum of the joint, and through the joint itself, dividing the ligaments at one cut; the knife is then passed under the phalanx, which is to be amputated, and a flap of sufficient extent is separated from the palmar side.

Not always practicable.—This mode of amputating is more expeditious than that first described, but it is not applicable to those cases in which the finger is straight and the joint stiffened from disease, as the knife cannot be then introduced into the joint from the back part; there is also much difficulty in separating the flap without including

part of the flexor tendons ; and, upon the whole, the union of the divided parts is not so easily accomplished.

Applicable to the Toes.—These operations are equally applicable to the same joints of the toes.

Amputation of a whole Finger.—When it is necessary to remove the whole of a finger, I think it better to saw off the extremity of the metacarpal bone, rather than to open the joint. If the middle or ring finger be thus removed, less deformity results from the operation, as the remaining fingers approximate much more than when the extremity of the metacarpal bone is left ; if the fore or little fingers are amputated in this manner, an ugly projection is prevented, which would not be of any utility if suffered to remain. The wound also unites more readily, than that which is produced by the amputation through the joint.

Instruments.—The instruments required in performing this operation are, a common pointed scalpel, and a metacarpal saw ;* and my metacarpal saw moves upon its axis, so that it can be made to cut in any direction.

Operation.—The finger to be amputated being extended and separated from the others, two incisions are to be made through the integument, which meet at an angle over the dorsum of the metacarpal bone, at a short distance below the digital extremity, and terminate on each side of the first phalanx at the natural separation of the fingers ; two other incisions of the same form and extent are to be made on the palmar side, which are to join the former between the fingers ; the scalpel is then to be passed down on each side of the extremity of the metacarpal bone, so as to divide it completely from its lateral connexions, and the extensor and flexor tendons are also to be cut through at the point of the first incisions ; this being accomplished, the blade of the metacarpal saw is to be introduced between the bones, and the extremity to be removed is to be carefully sawn off.

Dressing.—The edges of the wound are to be brought into contact, by binding the fingers on each side of it together, when the hand and fore-arm are to be supported by a sling, as after the former operation.

Operation of the Fore or Little Finger.—In amputating either the fore or little finger, only two external incisions are required, which should begin at a point below the extremity of the metacarpal bone, as in the other case, only over the centre of that side which is outermost, and extend one over the joint and the other under it in an oblique direction, so as to meet between the fingers ; two flaps are then to be raised, so as to expose the extremity of the metacarpal bone ; the separation of which is to be completed as before described. The edges of the wound are to be brought into contact by the application of adhesive plaster, and the arm to be supported.

* In amputating part of a metacarpal or metatarsal bone, I always use a chain saw, which I find much more convenient than the common metacarpal saw, being employed with greater facility and cutting more rapidly.—T.

Application of Ligatures to the Vessels.—If the vessels which are divided in any of these amputations afford a troublesome hæmorrhage, which cannot be readily checked by pressure, it will be proper to secure such vessels by ligatures, before the edges of the wound are finally approximated ; and after any amputation, when a ligature has been applied upon an artery, one of the ends of the silk should be cut off a little beyond the knot on the vessels, as it is perfectly useless, and, if allowed to remain, only tends to increase irritation.

Toes to be Amputated at the Joints.—When it becomes necessary to remove any of the toes, they should be amputated at the joint in preference to separating the extremity of the metatarsal bone ; because it is desirable to preserve the width of the foot and support of the body, which would be diminished by the removal of part of the metatarsal bone.

Operation nearly the same as before mentioned.—The operation may be performed in the same way as that last described for the removal of the fingers, excepting that the incisions should not reach beyond the joint, which should be opened from the side, as in the amputations at the second and third joints.

After-treatment.—After any of these operations upon the toes, the patient should observe the recumbent posture, until union of the edges of the wound has been effected.

Amputation through the Metacarpus or Metatarsus.—Amputation should be performed through the metacarpal or metatarsal bones, when all the fingers or toes are so much injured as to require removal ; it is much better than amputating through the carpal or tarsal bones, as, in the hand, the patient afterwards derives great advantage from the use of the carpus, which is thus preserved, and, in the foot, the insertions of the tibialis anticus, with those of the peroneus longus and brevis being uninjured, the remaining part of the foot is much more useful, than when the metatarsal bones are entirely removed : in either case the wound unites sooner than when the articulations are exposed.

Portions of the Hand removed.—In some cases, if the injury or disease does not extend to all the metacarpal or metatarsal bones, only such as are injured or diseased should be amputated. Thus, in the hand, the thumb with its metacarpal bone alone may be removed, or all the fingers with their metacarpal bones may be amputated, the thumb being allowed to remain ; the middle and ring fingers, the ring and little fingers ; or the middle, ring, and little fingers with their metacarpal bones, may, in like manner, be separated from the others.

Of the Foot.—In the foot, the great toe and its metatarsal bone may be amputated from the others, or the others from it ; or the second and third, the third and fourth, the fourth and fifth ; or the third, fourth, and fifth may be removed together with their metatarsal bones.

Case.—In one instance I removed the middle and ring fingers with their metacarpal bones ; approximating the fore and little fingers,

which were not injured, by bandage. The patient recovered quickly, having perfect use of the remaining portion of the extremity.

Case.—I also, in another patient, amputated the thumb and the three inner fingers with their metacarpal bones, leaving only the fore finger, which was infinitely more useful than any artificial hook could have been.

Cases.—The metatarsal bone of the great toe I have several times had occasion to remove ; and Mr. Key has amputated the four smaller toes, with their metatarsal bones, the two outer cuneiform, and the os cuboides, successfully ; leaving the os calcis, astragalus, navicular and internal cuneiform bones of the tarsus, with the metatarsal bone of the great toe and the toe itself.*

OF AMPUTATION THROUGH THE CARPUS.

Instruments.—The only instrument required is the catling.

Application of the Tourniquet.—Before commencing the operation, the tourniquet should be applied on the upper arm.

Operation.—The patient being seated in a chair, the surgeon first makes a circular incision through the integument, just over the bases of the metacarpal bones, which should include more of the integument upon the back of the hand than towards the palm ; he then dissects the skin back as far as the styloid process of the radius ; the integument is held back by an assistant, whilst the surgeon takes hold of the hand he is about to remove ; and, feeling for the extremity of the styloid process of the radius, he passes the catling into the joint between the radius and scaphoid bone, by dividing the external lateral ligament ; and he completes the amputation by carrying the knife through to the inner side of the carpal joint.

Vessels.—It will be necessary before dressing the stump to secure the ulna and radial arteries by ligatures.

Dressing.—The edges of the integument are to be brought together over the extremity, and retained in contact by means of straps of adhesive plaster,† passed from over the flexor to over the extensor muscles, and these straps are to be confined by a circular piece, after which the arm is to be supported in a sling, or upon a pillow, if the patient be confined to bed.

Amputation between the Second and Third Row.—I have known the hand amputated between the first and second row of the carpal

* I have amputated through the metacarpal bones of the fingers, leaving only the thumb ; and in another patient I removed the three inner fingers, with half of the metacarpal bone of the middle, and the whole of those of the ring and little fingers, together with the unciform and orbicular bones of the carpus. Both cases succeeded.—T.

† I prefer the plaster I have before recommended, composed of equal parts of the empl : thuris comp : and empl : saponis, to the common adhesive plaster, on account of the tendency of the latter to create irritation.

bones, but I think it objectionable on account of the number of joints which are exposed.

OF AMPUTATION THROUGH THE FORE-ARM.

Instruments.—The necessary instruments are, the catling and the saw.

Position.—The patient is to be seated, and the tourniquet applied as in the former operation.*

Operation.—The limb being extended, the surgeon commences the operation, by making a circular incision through the integument sufficiently high to avoid the numerous tendons at the lower part of the fore-arm; then he separates the integument from the subjacent parts, and turns them back to the extent of about an inch and a half; an assistant keeps this supported whilst the surgeon cuts through the superficial muscles by another circular incision, and allowing a short time for their retraction, he divides the deep-seated layer, and exposes the bones, from which he carefully separates the muscles and interosseous ligament, by passing the catling between and around the ulna and radius at the part on which he intends to apply the saw. The fore-arm is then held in such a position that the surgeon can easily saw through both bones at once, in doing which he should make use of the whole of the cutting edge of the instrument, and employ very little pressure, as the weight of the saw itself is almost sufficient. If the ends of the bones have any sharp points projecting from them, which will sometimes happen if they have not been cleanly sawn through, these points should be carefully taken off by the bone nippers.

Vessels.—After this amputation four vessels will generally require to be secured; viz., the ulna, radial, and two interosseal arteries.

Dressing.—The wounds should be dressed as that after the amputation through the carpus, and the same treatment adopted.

Two Flaps.—This amputation may be performed by making two flaps, one formed from the posterior, and the other from the anterior part of the fore-arm.

Danger of amputating low down.—I have seen two cases in which inflammation and sloughing of the tendons have followed amputation performed through the lower part of the fore-arm a little above the carpus; they both proved fatal. It is better therefore to avoid operating at this part, as little advantage is gained by leaving more of the bones, and the risk is greatly increased.

* If the integument of the limb be covered with hair, the patient will be saved much suffering by having that part, on which the plaster will be applied, shaved, before the commencement of the operation; otherwise when the plaster is removed, these hairs are drawn out with it, rendering the separation of the dressing extremely painful.—T.

OF AMPUTATION THROUGH THE UPPER ARM.

Instruments.—The same instruments as used in the last operation are all required.

Position.—The tourniquet should be applied sufficiently high to allow of ample space for the performance of the amputation, and the patient should be seated in a low chair.

Operation.—An assistant extends the arm, and the surgeon first drawing up the integument with his left hand, so as to put it on the stretch, divides it by a circular cut with the catling, about one inch and a half above the olecranon; he then raises it from the parts beneath to the extent of about two inches, according to the size of the limb, and turning it back, he, by another circular cut, carried close to the reflected integument, divides the superficial muscles, and subsequently the deep-seated muscles down to the periosteum, and he finishes with the knife by cutting through the periosteum at the part on which he is to apply the saw. The integument and muscles being carefully held back, the saw is applied and the bone divided, when the amputation is complete.

Vessels.—Three arteries will generally require the application of ligatures, viz., the brachial, profunda, and ramus anastomoticus.

Dressing.—The edges of the integument are to be brought together by the application of adhesive plaster, and the patient being placed in bed on his back, the stump is to be supported on a pillow, so as to be rather higher than the shoulder.

Application of a Roller.—If the skin be loose or the muscles flabby, a roller should be put around the limb to give support to these parts, before the patient be placed in bed.

It may be necessary in some cases to amputate higher up than I have mentioned, but the steps of the operation will be otherwise the same.

OF AMPUTATION AT THE SHOULDER JOINT.

Instruments.—The only instrument required is a catling.

Subclavian Artery compressed.—The subclavian artery is to be compressed upon the first rib, from above the clavicle, by an assistant. The ring of a common key covered with some soft linen is a convenient instrument for this purpose.

The patient should be seated on a low chair, and the arm to be removed should be elevated a little from the side by an assistant.

Two Modes of operating.—The operation may be performed by making a single flap or two flaps; I prefer the former, but in some cases, on account of disease extending so as to prevent the formation of a single flap, the latter mode should be adopted.

Operation with a single Flap.—In making the single flap, the surgeon raises the deltoid muscle with the fingers and thumb of his left hand, and introducing the catling through the integument, and under the

muscle near to its insertion, he cuts upwards close to os humeri as far as the under part of the acromion process; the integument and larger part of the deltoid muscle are thus raised, so as completely to expose the outer part of the shoulder joint; the arm being then drawn downwards, the catling is passed into the joint at the anterior part, so as to divide the tendon of the biceps muscle, and afterwards is carried round the head of the bone to cut through the capsular ligament; the separation of the limb may be completed either by passing the knife over the head of the bone, and cutting downwards to the axilla, or by placing the knife in the axilla and dividing upwards to the joint; in either case the amputation should be finished by one stroke of the catling.

Vessels.—The axillary artery is to be immediately secured by a ligature, and small branches from the circumflex arteries may be required to be tied.

Operation with two Flaps.—When two flaps are required, the first incision extends from just below the point of the acromion downwards, and backwards into the axilla, being curved a little forwards, and passing below the insertion of the latissimus dorsi muscle; the back flap is then raised, dividing at the same time part of the deltoid, and the insertion of the latissimus dorsi; the anterior incision through the integument is begun from the same point as the posterior, but carried downwards and forwards below the insertion of the pectoralis major, into the axilla, so as to meet the termination of the first incision; this flap is then raised in part, to expose the capsular ligament, which is to be divided, together with the tendon of the biceps muscle as in the former operation; after which, the head of the bone being dislocated, and the flaps being held back, the catling is passed behind the bone, and the amputation is completed by dividing the remaining portion of the interior flap together with the axillary vessels, nerves, &c. The artery is to be secured as before mentioned.

Dressing.—After either mode of amputating, the straps of adhesive plaster, employed to keep the edges of the wound in contact, are best applied from before to behind, and should be of sufficient length to keep a firm hold.

Operation successful.—In every instance in which I have performed the amputation through this joint, and every case in which I have seen it done, the recovery of the patient has been speedy and perfect.

OF AMPUTATION BETWEEN THE TARSUS AND METATARSUS.

Instruments.—As I think it best to saw off that part of the internal cuneiform bone, which supports the metatarsal bone of the great toe, a saw will be required, as well as a strong catling.

Position.—A tourniquet should be applied upon the thigh, and the patient should be placed upon a low table in the recumbent posture.

Operation.—The leg and foot being extended, and fixed by an assistant, the surgeon divides the integument across the dorsum of the

foot, commencing at the base of the metatarsal bone of the great toe, and terminating the incision about half an inch beyond that of the little toe ; he then makes a lateral incision on each side, so as to enable him easily to dissect up the flap of the integument as far as the joints of the four smaller metatarsal bones, and that part of the internal cuneiform which is on a level with these articulations ; the extensor tendons being next divided, the four small metatarsal bones are bent downwards, and their ligamentous connexions with the tarsal bones cut through with the point of the catling, after which, the internal cuneiform bone is sawn through even with the other tarsal bones : the amputation is completed by passing the catling between the separated bones, dividing the flexor tendons, &c., and forming a flap of about equal size to the superior from the integument on the sole of the foot.

Vessels.—The anterior tibial on the dorsum pedis, and the two plantar arteries of the sole, will most probably require the application of ligatures.

Dressing.—The integument is to be brought over the extremities of the bones, and the edges of the wound kept in contact by straps of adhesive plaster, passed from the sole to the dorsum ; the patient is to be placed in bed, and the foot supported by a pillow, until union has taken place.

A single Flap may be made.—Sometimes a single flap may be made from the dorsum, or sole of the foot, but it does not unite so readily as the double flap.

OF AMPUTATION THROUGH THE TARSUS.

Instrument.—A catling only is necessary in performing this operation.

Position.—The tourniquet must be applied, and the patient placed as in the former case.

In this operation, the navicular bone is to be separated from the astragalus, and the os cuboides from the calcis.

Operation.—The surgeon, having felt for the projecting point of the navicular bone on the inner side of the foot, cuts through the integument about three quarters of an inch beyond it, straight across the dorsum of the foot, and having made two small lateral incisions, he dissects back the upper flap, and divides the extensor tendons over the articulations, which he then opens, first, by cutting through the lateral ligaments on the inner side, uniting the navicular bone to the astragalus, then the ligament on the dorsum connecting the same bones, and afterwards the ligaments between the os cuboides and calcis, above and externally ; the knife being then passed down between the articulations, the inferior ligaments with the flexor tendons and muscles in the sole are divided, and the operation concluded by making an inferior flap of the integument equal to the superior.

Vessels.—The same arteries require to be secured as after the former operation, and the dressing and after-position of the patient are to be similar.

Not a successful Operation.—From a comparative result of this operation, with that of sawing through the tarsal bones, I am certain the latter produces less irritation and danger than the former.

OF AMPUTATION OF THE LEG BELOW KNEE.

Various Modes of operating.—This operation may be performed with a circular incision, and with a single or double flap. I prefer the first, but cases may present themselves, in which it may be proper to adopt either of the other modes.

Instruments.—In performing the operation with a circular incision, a small amputating knife is usually employed in completing the first step ; but a catling is necessary to divide the soft parts between the tibia and fibula ; and this, if rather larger than usual, does equally well in the commencement. A saw is also required.

Position.—The patient is to be placed in a recumbent position, on a table, and the tourniquet is to be applied upon the thigh.

Operation.—One assistant holds the leg, and supports it at a convenient height ; another assistant grasps the leg just below the knee and keeps the integument stretched by drawing it towards the thigh, when the surgeon commences his first incision over the anterior part of the tibia, about six inches below the patella, and carrying the knife round the limb, he at one sweep divides the integument, terminating the incision at the point from which he commenced ; he next separates the integument from the subjacent parts to the extent of two inches or more, and turns it up, in which position it is retained by an assistant, whilst the surgeon cuts through the superficial muscles, close to the reflected integument ; and having allowed these to retract, he divides the deep-seated with the interosseous ligament and the periosteum by passing the catling between and around the bones. The knee being then turned inwards, the saw is applied first upon the tibia, and when this bone has been in part divided, the saw is made to act upon the fibula also, so that the amputation is finished by sawing through the remaining portion of the tibia and the fibula together.

OF AMPUTATION WITH A SINGLE FLAP BELOW KNEE.

May be performed in two Places.—This operation may be performed as low down as possible without interfering with the Tendo Achillis, when the patient is desirous of afterwards wearing an artificial leg made of cork, instead of the common wooden one ; otherwise the bone should be sawn off at the same point, as when the circular incision is made.

Instruments.—A long catling and a saw will be required.

Operation.—The position of the patient, and of the limb, being as when the circular operation is performed, the surgeon feels for the posterior edges of the tibia and fibula, over one of which he places the thumb, and over the other the fore finger of his left hand, the palm

resting upon the anterior part of the limb; the extremity of the catling is then introduced immediately below one of these points, and steadily thrust through the calf of the leg, until it protrudes just below the other point, when the blade is carried downwards, so as to form a flap of sufficient size, from the muscles and integument posteriorly; the next step of the operation is, to divide the integument anteriorly, by making an incision commencing at the place at which the catling was thrust in, passing over the fore part of the leg, and terminating at the spot from which the catling was pushed out: the amputation is completed after this, in the same manner as in the common operation.

Operation with a double Flap.—A double flap is sometimes made from the outer and inner sides of the limb, when the surgeon commences the operation by an incision on the outer part of the leg, reaching from the anterior edge of the tibia to the back of the calf; and having a semicircular form with the convexity toward the maleolus externus, he then dissects back the flap of integument, and afterwards makes a corresponding flap on the inner side, commencing and terminating as the former. The flaps being held back by an assistant, the operation is finished in the usual manner.

Vessels.—After either of these amputations three vessels will have to be secured, viz., the anterior tibial, the posterior tibial, and sometimes the peroneal.

Dressing.—It is best in either case to place the straps of adhesive plaster, when dressing the stump, from side to side, rather than from above to below, as, by this, pressure is avoided upon the anterior edge of the tibia, which might otherwise produce much irritation and ulceration.

After-position.—The patient should be placed upon his back in bed, and the thigh being flexed towards the abdomen, a pillow should be put under the ham, and the stump be allowed to hang over it. The limb should be inclined a little to the outer side.

Objections to a single Flap.—The objections to the operation with a single flap are, that the wound does not unite so readily as that made by a circular incision; and if after-hæmorrhage occurs, which renders it necessary to open the stump, there is a greater difficulty in securing the bleeding vessels; and in debilitated persons, the disturbance of the adhesions is likely to produce a slough of the flap. The anterior edge of the tibia being also more exposed is more likely to exfoliate, and the subsequent contraction of the flap makes the union tedious.

Sometimes necessary.—When, however, the integument upon the anterior part of the leg has been destroyed, the formation of a single flap from the posterior part becomes absolutely necessary.

OF AMPUTATION ABOVE THE KNEE.

Instruments.—A large amputating knife and a saw will be required.

Position.—The patient is to be placed upon a table on his back, and the tourniquet is to be applied high enough upon the thigh to allow of ample room for the retraction of the integument and muscles.

Operation.—One assistant supports the leg, and another draws up the integument on the upper part of the thigh. The surgeon first cuts through the integument surrounding the limb about one inch and a half above the patella, to avoid the bursa of the rectus, beginning on the superior part over the rectus, and passing the knife round with one sweep to terminate at the same point; he then dissects up the integument for about three inches, and this is kept reflected by an assistant whilst the superficial muscles are divided by another circular cut close to it; the assistant holding the integument then draws it upwards to assist the retraction of these muscles, after which the deep-seated muscles and the periosteum are cut through so as to expose the bone, which is lastly to be sawn through.

Vessels.—The following vessels will require the application of ligatures: the femoral branches of the profunda, and sometimes the sciatic.

Dressing.—The integument is to be brought over the end of the stump from side to side, and confined by straps of adhesive plaster, after which the patient is to be placed upon his back in bed, and a pillow should be put under the upper part of the thigh so as to elevate the stump.

OF AMPUTATION AT THE HIP JOINT.

Femoral Artery to be secured first.—In this amputation it is decidedly the safest plan to secure the femoral artery by a ligature at Poupart's ligament, as the first step of the operation.

Mode of doing it.—An incision is begun two inches above the middle of Poupart's ligament, and is extended two inches below it: the femoral artery is to be laid bare, and the ligature, introduced at the centre of the incision, is to be tied upon the denuded vessel opposite Poupart's ligament, and above the arteria profunda.

Operation.—A long catling is then used to make the inner incision through the integument and muscles. This incision is to be begun at the lower part of that which was made to expose the artery, and it is to be carried from thence on the inner side of the thigh obliquely downwards, and is then continued on the outer side of the thigh below the trochanter major to the point at which it began; in this way a larger portion of integument is left to form a covering to the stump than would be produced by a circular incision without obliquity.

In the same line a second incision is to be made to divide the muscles, but the edge of the knife is to be inclined obliquely upwards towards the joint, and the integument and muscles being drawn back, those of the latter which are inserted into the trochanter major should be cut through.

A third incision is to be made to divide the psoas and iliacus in-

ternus muscles and the forepart of the capsular ligament, when the knee being pushed backwards and outwards the head of the bone is dislocated as far as the ligamentum teres will permit; this being divided, the head of the bone turns completely out of the acetabulum forwards.

A last incision is made by passing the knife over the head of the bone, and behind it, so as to cut through the remaining muscles, &c.

Not the quickest Mode.—I am ready to acknowledge that this is not the quickest mode of removing the limb; but securing the artery in the first instance prevents a patient, who is much reduced, from eventually sinking in consequence of the loss of a very considerable quantity of blood.

Vessels.—When the limb has been removed, branches of the obturator, ischiatic, and gluteal arteries will require to be secured. The sides of the wound are to be brought together, and if they easily meet, by adhesive plaster only; but if there be any difficulty in their coalescence, it is best to employ a suture.

The same after-treatment is necessary as after other amputations.

Preferable to saw through the Trochanter.—I am, however, of opinion, that in every case in which the amputation can be performed by sawing through the thigh bone below the attachment of the capsular ligament, that it should be done in preference to opening the joint and removing the head of the bone from its socket.

Case.—I have only once amputated at the hip-joint, and the patient recovered, but only after excessive suppuration from the acetabulum, sloughing of portions of the cartilage, and continuance of suffering and fever, exposing him to great risk, which would have been greatly lessened had it been possible from the state of the bone to have sawn through the os femoris at the trochanter.

Removal of the Dressings.—The removal of the dressing for the first time after an amputation must depend in a great measure upon the feelings of the patient as regards the stump, and from the appearance of the discharge.

On the Sixth or Seventh Day.—If the patient does not experience any unusual pain in the stump, the plasters should not be disturbed for six or seven days, by which time the adhesion of the edges of the wound will have become sufficiently firm to prevent any risk from the removing the dressings, provided it be done carefully.

Part cut away.—Should the patient experience shooting pain in the stump, and have other symptoms of suppurative inflammation, some portion of the plaster should be cut away from the lower part of the wound, in order to allow of the escape of any matter that may form, and a light poultice should be applied.

Plasters snibbed.—When a tightness is felt at any part of the stump from the pressure of the plaster, the surgeon should snip some of the straps on the side, which will generally relieve the pressure.

Mode of removing the Plaster.—When the stump is dressed, the straps of plaster should be taken off one by one, and care is required

not to disturb the ligatures ; if union of the wound be not complete, some fresh straps should be applied as the old ones are removed, by which mode separation of the edges of the wound may be greatly prevented.

Sometimes to be removed Early.—Should the first dressings become much loosened, or the stump be excessively painful, the plasters must be removed earlier than I have mentioned.

Separation of Ligatures.—If the ligatures do not come away by the fourteenth day after the operation, the surgeon should gently draw each thread when he dresses the wound, in order to expedite their separation.



LECTURE XXXI.

ON HERNIA.

Importance of the Subject.—THIS, of all the diseases to which the human body is liable, demands, upon the part of the surgeon, a large share of anatomical knowledge, great promptitude and decision, and the utmost skill and dexterity in the performance of an operation, when it is rendered necessary, by a defeat of the means employed for its reduction. In other important cases, consultations may be held, or the patient be sent to a distance to obtain the advantage of the best opinions ; but in hernia the fate of the patient is decided almost upon the instant, and an hour's delay may turn the scale of success against the surgeon, and destroy the prospect of safety on the part of the patient.

Definition.—A hernia is a protrusion of any viscus from its proper cavity ; but the term is principally applied to the protrusions of the abdominal viscera, to which it is at present my intention to confine my description.

Abdomen particularly liable to such Protrusions.—The abdomen is particularly liable to such protrusions, on account of the moveable state of its viscera, of the natural openings from it to give passage to blood-vessels, and unnatural apertures from deficiency of structure, and from the great changes in bulk to which the omentum and mesentery are subject ; so that instead of being surprised at the frequency of its occurrence, it might be expected, from a knowledge of anatomy, that it would occur in many more instances than it does.

Kinds of Hernia.—There are several genera of abdominal herniæ ; four of which, however, are more frequent than the others ; viz., the inguinal, the femoral, the umbilical, and the ventral : but besides these, there is a hernia through the ischiatic notch, one through the foramen

ovale, a pudendal, a perineal, a vaginal, occasionally a protrusion takes place through the diaphragm, the kidneys have been found in a swelling in the loins, and the small intestines have been seen between the laminæ of the mesentery and mesocolon; but, to the two latter, the term hernia is scarcely strictly applicable.

OF INGUINAL HERNIA.

Of this hernia there are four different species :

Species.—1. The oblique, taking the course of the spermatic cord.

2. The direct, descending from the abdomen immediately through the external abdominal ring.

3. The congenital, or a protrusion into the tunica vaginalis.

4. The encysted hernia, composed of a bag and protrusion suspended in the tunica vaginalis.

Contained in a Sac.—Before any hernia is formed, unless in wounds, laceration, or deficiency of structure, a bag of peritoneum precedes the protruded viscera, and forms a sac in which they are contained, and which is usually called the hernial sac. This protrusion is somewhat thicker than the natural peritoneal lining of the abdomen, the pressure of the viscera leading to an interstitial deposition into the membrane; it is not placed loosely in the parts into which it is protruded, but it adheres by cellular tissue to all the surrounding structures.

OF THE OBLIQUE INGUINAL HERNIA.

Synonymes.—This is also called bubonocoele when seated in the inguinal canal; and, when it further descends, is named scrotal; as it takes the course of the spermatic cord, it might well be denominated spermatocoele.

Before I describe the course and dissection of this hernia, it is necessary that I should say something on the structure of the inguinal canal, and of the course of the spermatic cord.

Structure of the Inguinal Canal.—The spermatic cord first quits the abdomen midway between the anterior and the superior spinous process of the ilium and the symphysis pubis; it here passes between two layers of the fascia transversalis, the anterior layer of which is fixed in Poupart's ligament, whilst the posterior layer descends behind Poupart's ligament, and assists in covering the femoral artery and vein, and in forming the crural sheath; above the passage of the spermatic cord, the two planes of this fascia unite, and form a lining to the transversalis muscle, extending as far as the diaphragm. As the cord penetrates between these two planes, which form the internal ring, a thin layer or fascia unites it to the edge of each.

No part of importance is situated between the anterior superior spi-

nous process of the ilium, and the point at which the spermatic cord passes through the fascia transversalis; but between the latter place and the pubes, the epigastric artery takes its course. This artery is situated from one-fourth to one-half an inch upon the inner side of the internal abdominal ring, or passage of the spermatic cord, from the abdomen, and it passes to the inner part of the rectus muscle. The external iliac artery and vein are directly behind this internal abdominal aperture, and this opening is the beginning of the inguinal canal, in which the spermatic cord is next continued.

Boundaries of the Inguinal Canal.—The inguinal canal is bounded anteriorly by a superficial fascia from the abdominal muscles, and by the tendon of the external oblique: posteriorly, by the fascia transversalis, and by the tendon of the transversalis muscle; above, by the edges of the internal oblique and transversalis muscles, and below by Poupart's ligament; the canal is about two inches in length, and terminates at the external abdominal ring.

External Ring.—The external abdominal ring is formed by two columns of the tendon of the external oblique muscle united by fibres from Poupart's ligament; the upper column is inserted into the symphysis pubis, the lower column into the tuberosity of the pubes, the pubes bounds the opening below; between these columns the spermatic cord passes; and from the edge of the ring, as well as from the surface of the tendon of the external oblique muscle, a thin fascia descends, uniting the cord to the edges of the opening, and passing down upon it to the tunica vaginalis; this fascia is then situated between the skin and the cremaster muscle; which muscle arises within the inguinal canal from the internal oblique muscle; it descends with the spermatic cord, and passes through the external abdominal ring; spreading over the fore and lateral parts of the cord as far as the tunica vaginalis into which it is inserted.

Spermatic Cord.—Behind the fascia and cremaster muscle the spermatic cord is found passing to the testis; it is covered by the tunica vaginalis, and is composed of the spermatic artery and vein, absorbents, and nerves, with the vas deferens and an artery accompanying it.

Origin and Course of the Hernia.—The oblique inguinal hernia first enters the upper opening of the inguinal canal, or internal abdominal ring, so that at its commencement it is placed just mid-way between the anterior superior spinous process of the ilium and the symphysis pubis, and close above Poupart's ligament; it has the spermatic cord behind it, and the epigastric artery to its inner side: when in the inguinal canal it is about two inches in length, and is covered anteriorly by the superficial fascia of the external oblique muscle and by the tendon of that muscle, the inferior edges of the internal oblique and transversalis muscles form an arch over it; the cremaster muscle covers it partially; it has a thin slender covering from the edge of the internal ring; the fascia transversalis, strengthened by the tendon of the transversalis, is situated behind it, and to its inner side; and Poupart's ligament is placed below it.

Appears at the External Ring.—Having descended through the inguinal canal, it next emerges at the external abdominal ring, and it is then usually denominated scrotal hernia.

Increases more rapidly.—Its increase being then much less restrained than before, it descends on the fore part of the spermatic cord to the testicle, at the upper part of which it usually terminates.

Dissection of the Hernia.—Upon dissecting this hernia below the external ring, there is found covering it;—first, the fascia of the spermatic cord, derived from the external oblique tendon and the edge of the abdominal ring; this substance is dense, and forms a strong covering, which has often been mistaken for the hernial sac; when this has been divided, the cremaster muscle becomes exposed, covering the fore and lateral parts of the hernial sac. The cremaster muscle is thicker than the fascia of the cord, and its muscular texture is easily distinguished in the living body. On cutting through this muscle, and a dense cellular tissue, the hernial sac is laid bare, united on the fore part to the cremaster muscle, and on the posterior part to the spermatic cord, resting below upon the tunica vaginalis of the testicle.

Usual Contents of the Sac.—The usual contents of the hernia are either intestine or omentum; if the former, it is called enterocele; if the latter, it is denominated omental, or epiplocele. In the young, omental hernia is rarely met with, it being generally intestinal, for this obvious reason, that the omentum in the young subject covers only the superior abdominal viscera.

VARIETIES OF OBLIQUE INGUINAL HERNIA.

Varies in Size.—From the description which I have given of this hernia, it is clear that it may vary in length, from the upper ring to the testicle, and consequently that it is sometimes seen occupying only the inguinal canal.

Sometimes very large.—In most cases the hernia is so large as nearly to reach the knee, but in general it does not exceed two fingers' breadth, and barely reaches to the upper part of the testicle; its bulk depends considerably upon the time which it has existed, upon the degree of relaxation of the patient, and upon his inattention to the disease.

Unusual Protrusions.—I have seen the pylorus descend to the mouth of the hernial sac. The urinary bladder is also occasionally situated within it;* and we have an excellent specimen in the collection at Guy's Hospital, of an inguinal hernia in the female, where the ovarium and fallopian tube are protruded into the hernial sac.†

Usual Situation of the Spermatic Cord.—The spermatic cord is usually situated behind the hernial sac; but in one of the preparations

* When the cæcum or urinary bladder are protruded, there is not a complete peritoneal sac; but it is deficient at that part of either viscus not naturally covered by it.

† See hernia in the female.

in the Museum at St. Thomas's Hospital, the cord is divided, the vas deferens passing upon one side, and the spermatic artery and vein upon the opposite side. I have seen also the spermatic artery and vein passing over the fore part of the sac, while the vas deferens passed behind it.

SYMPTOMS OF INGUINAL HERNIA.

Distinction from other Diseases.—It is discriminated from other diseases by the following marks:—it gradually descends from the abdomen in the course of the spermatic cord: it usually protrudes in the erect, and retires when the patient is in the recumbent posture: it dilates upon coughing, and upon all exertions of the abdominal muscles: flatus may be often felt in it when it is intestinal, and it retires with a gurgling noise; when omental it has a doughy feel, is much less elastic than the intestinal hernia, and retires into the abdomen more slowly; the intestinal is accompanied with costiveness, and with pain across the abdomen; the omental rarely produces any disturbance of the abdominal functions, when in the reducible state; the hernia of the bladder is distinguished by the diminution of the swelling during the evacuation of the urine.

The following are the principal marks of distinction from the diseases with which it is most likely to be confounded.

From Hydrocele.—From hydrocele, by that disease beginning below, and gradually ascending, by its transparency, by its fluctuation, its pyriform shape, its involving the testicle, and by the want of dilatation from coughing; however, there is an exception to this, if the hydrocele enters the upper part of the scrotum, when it sometimes dilates upon coughing, and the only means of distinction are in its history, its transparency, and its fluctuation.

From Hydrocele of the Cord.—From hydrocele of the spermatic cord, it is with great difficulty distinguished, unless the hydrocele emerges from the external ring, when its transparency indicates its true nature.

Hernia and Hydrocele sometimes combined.—Hydrocele and hernia are sometimes combined in the same individual, of which there is a beautiful specimen in the collection at St. Thomas's Hospital: a case of this kind occurred to Mr. Thomas Blizard, on which he operated, and a similar one to Mr. Henry Cline; in each case the water was in the first instance discharged, and then the hernial sac became exposed behind the tunica vaginalis.

Hydrocele is also connected with hernia, when there is water in the abdomen; and I have tapped a hernial sac in ascites for the discharge of the accumulated water, and it is the best mode of operating in such a case, when it is quite certain that neither the omentum or intestine are descended, and that you can decide by the transparency.

From Hæmatocele.—Hernia is known from hæmatocele, by the

latter being usually the result of a blow, and by the ecchymosis which at first accompanies it, by its not extending to the inguinal canal, by its not dilating upon coughing, by the bowels being undisturbed, and by its not returning into the abdomen.

From Diseased Testicle.—Hernia is little liable to be confounded with disease of the testicle; the history of its swelling, its form, the distinctness of the spermatic cord, the want of intestinal obstruction, the absence of dilatation on coughing, and its not returning into the abdomen, are sufficient marks of the latter disease.

Hernial Sac connected to the Spermatic Cord.—I have seen, however, diseased testicle complicated with hernia, and have twice been under the necessity of dissecting the hernial sac from the spermatic cord, during the extirpation of the diseased testicles. In one case I opened the sac unintentionally in the operation, but it did not prevent the patient from doing well.

Acute Inflammation of the Testicle, mistaken for Hernia.—The acute inflammation of the testicle is the only state which I have known confounded with hernia; the tenderness of the part, the swelling extending up the cord, and the vomiting accompanying the disease, led to a doubt which could only be removed by a knowledge of the history and progress of the complaint.

From Varicocele.—The disease with which hernia is most frequently confounded is varicocele, or enlargement of the spermatic veins; this is a very common complaint, it occurs most frequently upon the left side, and is supposed to be founded in the termination of the left spermatic vein, at right angles with the emulgent. It sometimes dilates upon coughing; it appears in the erect, and retires in the recumbent position. It is distinguished from hernia by its feel (which resembles that of a bag of large worms), by its being unattended with intestinal obstructions, by placing the patient in the recumbent posture, and emptying the swelling into the abdomen; then pressing the finger upon the external ring to prevent any visceral descent, by which the free return of blood by the spermatic vein is obstructed, and the swelling re-appears when no hernia could escape.

Truss applied for Varicocele.—I have more than once known a truss applied for this disease, and in one instance the son of a medical man, by his father.

The Hernia most Frequent on the Right Side.—Inguinal hernia occurs more frequently upon the right side than the left, probably because the greatest exertions are made of the right side, from the preference we give to the use of the right arm, two-thirds of inguinal hernia are upon the right side.

CAUSES OF HERNIA.

Loose Connexion of Viscera.—The loose connexions of the jejunum, ilium, colon, and omentum, give a proneness to the disease. The other viscera are rarely found in hernia.

Natural Apertures.—The natural apertures for the passage of the blood-vessels also lead to the ready production of hernia.

Malformations.—Malformations also give rise to hernia, as when the abdominal ring is unnaturally large. Some species of hernia are originating entirely from malformation, as the phrenic and ventral.

Increase of Omentum or Mesentery.—Great increase of the omentum or mesentery in obesity leads to hernia. Pregnancy produces it. Violent exercise frequently occasions it, by forcing the viscera through the apertures. Great exertions of the abdominal muscles in lifting weights, more especially in the stooping posture, is a common cause of this disease, as also of coughing or straining violently. Flatulent food, and food difficult of digestion, tends to produce hernia. Great wasting of the body, by leaving the abdominal apertures relaxed, is also a cause.

Thus, then, the parietes give rise to hernia, by their formation, malformation, and contraction : and the viscera by their pressure, and from the changes they undergo, especially in old age.

Climate.—The lax state of fibre, induced by a long residence in warm climates, may also be mentioned as pre-disposing to the formation of hernia.

OF THE REDUCIBLE HERNIA.

A hernia is said to be reducible when it can be returned into the cavity of the abdomen.

Treatment.—In order to put the patient into a state of safety, and to prevent a future descent, a truss is to be applied. A truss is required for the smallest hernia, as the danger from this disease is in an inverse ratio to the size of the tumour.

Salmon and Ody's Truss.—Salmon and Ody's truss is most easily worn, and most appropriate for recent and small hernia ; but the objection to it is, that it cannot be worn during the night, and therefore the patient requires one of a different kind in bed. They are, however, excellent trusses.

Egg's Truss.—Egg's truss, and those of the common kind, are worn day and night, and make a steady pressure on the part.

Pindin's Truss.—Hernia, very difficult to support, are best prevented protruding by Pindin's truss, which has no springs ; I have seen it succeed when no other answered the purpose.

To obtain a truss, it is only necessary to send the measure of the pelvis to the instrument maker. The principle upon which the pad of the truss is to press, is the whole length of the inguinal canal ; that is, to reach from the upper to the lower ring.

Effect of a Truss.—Will this cure me ? the patient inquires : Yes, if he be young, assuredly : if old, I have known it do so in a few instances. How long must I wear it ? to which the answer is, A year after the hernia does not appear when the truss is removed for a few hours, the patient at the time taking his usual exercise. Am I to wear

it at night as well as by day? Yes, or you have little chance of being cured; and there is otherwise danger of strangulation.

In consequence of wearing a truss, the sac falls into folds, and gradually contracts; but more particularly at its orifice. If hernia be complicated with hydrocele from the abdomen, both diseases are cured by wearing a truss.

Danger of leaving off the Truss.—Giving up the use of a truss before the cure is complete, is very dangerous; as from the contraction and thickening of the mouth of the sac, there is more liability to strangulation. The shut sac of a hernia will sometimes produce hydrocele by the secretion from its inner surface.

LECTURE XXXII.

IRREDUCIBLE HERNIA.

It is so called when it is uninflamed, but does not return into the cavity of the abdomen; and it acquires this state from the following causes:—

Causes.—1st. Growth of the protruded omentum or mesentery, rendering it too large to return through the orifice of the hernial sac.

2d. Adhesion of the omentum, mesentery, or intestine, to the inner surface of the sac.

3d. Membranous bands formed across the sac by adhesion.

4th. Omentum entangling the intestine.

5th. A protruded cæcum, in which the intestine adheres by cellular membrane behind, and the sac exists only on the fore part.

6th. A portion of omentum suddenly protruded, of too large a size to be immediately returned.

DANGER OF IRREDUCIBLE HERNIA.

Rupture of Intestine.—If intestine be protruded, it is sometimes ruptured from a blow upon the tumour.

Liability of Strangulation.—There is a constant liability of strangulation from any slight additional protrusion.

Formation of Abscess.—I have known an abscess form in the protruded omentum, and prove destructive.

TREATMENT OF IRREDUCIBLE HERNIA.

To give Support.—Nothing can be done in some of these cases, but to give support to the part by the application of a laced bag truss. When it arises from obesity, attention to diet, and to the means of reducing the patient, may sometimes succeed, for I saw a gentleman who became reduced by dropsy in the chest, and had a hernia return, which had been for a long period irreducible.

Use of Ice.—Apparently in irreducible omental hernia of recent formation, I have known the application of ice succeed when there was not any inflammation proceeding, as far as could be ascertained by the pain.

Case.—A physician who had an omental hernia irreducible for a fortnight, had ice applied to it through the medium of a bladder, for four days, during which period it gradually returned. In another case the same treatment was successful; and it appeared to me that the ice was serviceable, by occasioning a constant contraction of the skin, and supporting moderate pressure on the part.

OF THE STRANGULATED OBLIQUE INGUINAL HERNIA.

Definition.—When the parts protruded into the hernial sac cannot be returned into the abdomen, and the pressure is so great as to prevent the free circulation of blood through the vessels of the protruded viscera, the hernia is said to be strangulated, and the following symptoms are usually present.

Symptoms.—The patient directly feels violent pain in the region of the stomach, as if a cord were bound tightly round his body; and this is followed by frequent eructations which continue until the strangulation be removed;—there is a great desire for a fæcal discharge; but the person only passes a small quantity of fæces from the large intestines. The tumour feels hard, and if it be intestine which has descended, it is often extremely tender to the touch. Vomiting soon occurs; first the patient throws up the contents of the stomach, afterwards bile, which is regurgitated from the duodenum; and if it be a portion of the large intestine which is strangulated, fæcal matter is sometimes discharged from the stomach, as the symptoms become more urgent. The pulse is at first hard, and rather quicker than natural.

More urgent Symptoms.—On the next visit to the patient, the vomiting is more urgent, the costiveness remains, the abdomen is tense from flatulence, the tumour is harder and more tender, the pulse is more frequent, smaller, but still hard.

Peritoneal Inflammation.—Strangulation still continuing, the abdomen becomes extremely tender to the touch, on account of the peritoneum becoming inflamed, at the same time the pulse is very small, thready, and frequent: in addition to the other symptoms, hiccough

occurs, the vomiting and costiveness continue, the tumour becomes more tense, often is inflamed upon its surface, and now and then the marks of the fingers, when pressed upon it, remain.

Last Stage.—In the last stage, the pulse frequently intermits, the patient is covered with a cold perspiration, but his mind appears less depressed, and as his pain is less, he has more expectation of recovery.

Explanation of Symptoms.—With respect to these symptoms, the pain in the abdomen, and the vomiting, are at first sympathetic; and the discharge of bile and fæculent matter afterwards is kept up by the anti-peristaltic motion, which takes place above that portion of intestine contained in the hernia; perhaps the valve of the colon may in some instances be imperfect, by which the vomiting of fæculent matter may be accounted for; the obstruction of the passage of the fæces by the usual course, is prevented by the strangulation of the intestine; the tension of the abdomen arises at first from accumulation of flatus, and subsequently from peritoneal inflammation, which also occasions the tenderness of the abdomen; the hiccough has been considered as an indication of gangrene; but I have known operations performed in many cases, after its appearance, and the patients have done well, the contents of the hernial sac not being found in a gangrenous state; the tension of the tumour is caused at first by accumulation of blood from obstructed circulation in the part; afterwards it increases from effusion into the hernial sac, in part of serum, and part of fibrin.

Evacuations just before Death.—It sometimes happens just previous to the patient's death, that he has evacuation from his bowels, and this probably takes place from the tension of the affected parts being lessened by the approach of dissolution.*

* I have introduced the following case as presenting some unusual peculiarity respecting the evacuation from the bowels, during the continuance of the symptoms of strangulation.

Thomas Davis, a porter, aged fifty-nine, (who had for two years been subject to hernia,) on Saturday, the 12th of March, 1825, after making some unusual exertions, found that the swelling formed by the hernia had much increased in size, and resisted his repeated attempts to reduce it. On Sunday morning, the 13th, he experienced pain in the tumour, and in the abdomen, which was soon followed by vomiting. In the evening, as he did not get better, he applied to a surgeon in his neighbourhood, who for some time tried the taxis, but ineffectually; in consequence of which he was taken to St. Thomas's Hospital. On examination, a femoral hernia was discovered on the right side, about the size of an egg, hard, and tender to touch. He was bled, and placed in the warm bath, and when he appeared faint, the taxis was again employed, under which the hernia became apparently lessened, but not completely dispersed. As he was not perfectly certain of its being quite reducible before the existing symptoms, I was induced to order an enema; and directed, in case of a free discharge from the bowels after its use, that some purgative medicine should be given by the mouth. He had a copious motion from the enema, and in consequence some pills of cathartic extract and calomel were given, after which, during the night, he had three more abundant motions. On the following morning (the 14th), however, I found that the tumour had regained its former magnitude and tension; that it was very tender, as also was the abdomen, and that he had hiccough, with occasional vomiting. Under these circumstances, after a further short trial of the taxis, and which made no impression upon the swelling, I performed the opera-

Variation in the Symptoms.—The symptoms of strangulation do not always continue equally severe; but for short intervals the patient is often nearly free from suffering, and then again the symptoms become violent.

DISSECTION OF THE HERNIA.

Before the Commencement of Gangrene.—If gangrene has not taken place, a small quantity of serum is found under the skin, and in the hernial sac a coffee coloured effusion of the same nature; this is usually more abundant when intestine has descended, than when omentum alone is protruded. The intestine is of a dark chocolate brown, and has its surface covered by a coat of adhesive matter, by which it is in part glued to the hernial sac, but not very firmly. Directly under the seat of stricture, the intestine has suffered particularly, and often gives way to very slight pressure of the fingers. If omentum has protruded, it is found red, and somewhat harder than natural.

When Gangrene has occurred.—When gangrene has taken place, the skin over the tumour is emphysematous, and retains any marks made by the pressure of the fingers. When the sac is opened, a highly offensive smell is emitted, and if intestine be protruded, it is of a deep port wine colour, and has on its surface numerous greenish spots, and its texture is so altered, that its surface loses its brilliancy, and it gives way to very slight pressure. Omentum, when gangrenous, is of a dark colour, easily breaks, and feels somewhat like a portion of lung, crackling under the pressure of the fingers.

Appearances in the Abdomen.—On opening the cavity of the abdomen, the peritoneum is found inflamed, red lines can be traced on the intestines, where they are lying in contact, and here adhesions are formed from effusion of fibrin. The intestines are immensely distended with flatus.

tion. The hernial sac was surrounded with enlarged glands; it contained a little fluid, and a portion of intestine, which was highly inflamed and perfectly incarcerated. This was liberated and replaced in the cavity of the abdomen without much difficulty, and the wound was dressed as usual.

In consequence of much tenderness of the abdomen, on pressure, in the evening, I ordered, Hirud. xxiv. abdom. Fot. Papaveris, et Tinc. Opii gutt. xxv.

15th. Less pain and tenderness of the abdomen. He had slept comfortably, (pulse 80, and feeble,) but he was troubled with occasional sickness; the hiccough had subsided: ordered, Mist: Efferv: pro re nata. c. Tinc: Opii gutt. v. Sin. dos, if the sickness continued. At two o'clock he was seized with dyspnœa and more frequent vomiting, but had no increase of tenderness. Ordered enema commun. c. Oleo Ricini, and to continue the mixture. The enema was repeated in the afternoon, but did not produce any evacuation, and late in the evening he died.

On examining the body after death, I found the peritoneum much inflamed, and exhibiting marks of previous disease, there being old and firm adhesions. The portion of intestine which had been strangulated consisted of a complete fold of the ilium, including the whole diameter of the gut; it had still the mark from the stricture upon it, and was much more discoloured than any other part.—T.

Symptoms less severe from Omental Hernia.—If omentum alone has descended, the symptoms are usually much less severe, and the patients live longer than when the hernia is intestinal.

SEAT OF STRICTURE.

External Ring.—In old and large hernia, the seat of stricture is at the external abdominal ring, but in by far the greater number of cases, the stricture is seated at the orifice of the hernia from the abdomen, at the internal ring, and here it is occasioned by the semi-circular edge of the tendon of the transversalis becoming thickened, as well as that portion of the hernial sac pressed on by this tendon.

In the Inguinal Canal.—I have also seen the stricture midway between the two rings, and it appeared in these cases to be occasioned by a thickening of the sac, which, by the exertions of the patient, had been frequently forced down to the external ring, and had again retired into the inguinal canal.

Stricture from Membranous Band.—There is also a beautiful specimen in the collection at St. Thomas's Hospital, showing a stricture formed by a strong membranous band within a hernial sac; the patient, from whom it was taken, had been operated on by one of the surgeons of that Hospital; and although the inguinal canal had been freely opened, yet the surgeon could not return the intestine without doubling it back, which he did, and brought the integument together over it by sutures. On the day following the operation, the intestine peeped out between the sutures, and was in a gangrenous state, and the case terminated fatally.

Omentum entangling Intestine.—Another occasion of stricture is from omentum entangling the intestines, an excellent example of which I operated upon in the case of a patient of Mr. Richard Pugh, of Gracechurch Street.

Cause of Strangulation.—The cause of strangulation is generally a sudden protrusion of an additional portion of intestine or omentum. The eating of vegetable food so as to produce flatulence, or very indigestible animal matter, is a frequent cause.

Danger in small Hernia.—A small hernia is much more easily strangulated than a larger one.

OF THE TREATMENT OF STRANGULATED, OBLIQUE, INGUINAL HERNIA.

Danger of Strangulation.—As the danger is entirely consequent on the pressure of the stricture upon the protruded viscus, the great object of the surgeon is to return the protruded part into the abdomen, as quickly as he can with safety.

Taxis, and Mode of employing it.—The operation for effecting this reduction is called the taxis, and it is performed in the following

manner:—The patient is placed in a recumbent posture, with his head and shoulders a little elevated, and his thighs at right angles with his body. His bladder should be previously emptied. The surgeon, standing on the right side of the patient, passes his right hand down between the thighs, to grasp the swelling, and with his left thumb and fingers he kneads the hernia at the upper part of the inguinal canal. Slight pressure and elevation of the scrotum, with a kneading of the upper part of the hernia, are used for the purpose of returning a small portion of the protruded parts, when the whole usually follows without difficulty. The pressure should be continued a quarter of an hour, at least, for I have known it succeed after a trial of twenty minutes. The object is to use a continued steady pressure, and not violent means; which in several instances which have come under my observation, have caused a rupture of the intestine, so that, in the operation, as soon as the sac has been opened, fæculent matter has escaped. If the strangulation has been long continued, the employment of force becomes doubly dangerous.

Intestinal Hernia most easily reduced.—The intestinal hernia is more easily reduced than the omental, it returns more suddenly, and with a gurgling noise, but sometimes the tenderness of the part is such as to forbid the immediate employment of the taxis.

Case.—I attended a young man, with Mr. Croft, in the city, who, from tenderness, could not bear the swelling to be touched. I ordered ice to be applied, and in seven hours the hernia returned without the aid of the taxis.*

Bleeding, advantage of.—If the taxis does not succeed, bleeding from the arm should directly be had recourse to. In all cases it is best to employ it, on two accounts. First.—By the faintness which it produces, it frequently becomes the means of assisting the return of the hernia. Second.—If the hernia be not reduced, it saves the patient from the danger of peritoneal inflammation, which an operation is likely to produce. I never saw it do harm; and have in many cases witnessed its extreme efficacy. In strong athletic persons it should be carried to a very great extent; in the old and infirm, little need be taken away.

Consequence of not Bleeding.—From neglect in bleeding, the patient very often dies, four or five days after the operation, from peritoneal inflammation. The object is to produce a fainting state, otherwise the bleeding does very little good.

Pulse deceptive.—Persons are very often deceived in peritoneal inflammation, on account of the small thready pulse with which it is

* In the month of May last, I was requested to see a publican in the Borough, who was suffering from the strangulation of a ventral hernia, about the size of an orange, seated in the linea alba, between the ensiform cartilage and umbilicus. The tumour was so extremely tender, that he could not bear me to make the slightest pressure upon it. I directed ice to be applied, which was kept on for three hours; after this period I succeeded easily in reducing the hernia, which had been strangulated nearly two days.—T.

accompanied ; but this, instead of being a bar to the abstraction of blood, only indicates a greater necessity for it. I shall have occasion to mention the great benefit derived from it, in a case in which hic-cough was extremely violent.

Warm Bath.—The next object which the surgeon has in view, when bleeding and the taxis fail, is to put the patient in the warm bath, which is of no use unless it occasion faintness ; and since I wrote my work on hernia, I have had several opportunities of witnessing its efficacy in assisting the reduction. If there is not immediate convenience for its use, no time should be lost in procuring it, as there are other and more powerful remedies.

Tobacco Glyster.—The most powerful agent in the treatment of strangulated hernia, is the tobacco glyster ; for if, when the patient is under the influence of this remedy, the hernia cannot be returned by the taxis, there is but little chance of any mode short of an operation succeeding. The manner of making it is to infuse one drachm of tobacco in one pint of water, and of this one half should be first thrown up, and according to the effect produced in twenty minutes, or half an hour, the other half may be injected, or not. This is the safest plan of administering the tobacco ; it produces extreme languor and relaxation of all the fibrous structures, and is certainly the most potent remedy which is employed, but at the same time requires the utmost caution in its use.

Fatal Effects of Tobacco.—I have seen a patient with strangulated hernia expire under the effects of tobacco, which had been used in the quantity of two drachms, without reduction of the hernia ; he was placed upon the operating table, but as his pulse could scarcely be felt, his countenance showed extreme depression, and as he was covered with a cold sweat, the operation was not performed, and the patient died, as the assistants were removing him.

Case.—A girl, who was sent to Guy's Hospital, by Mr. Turnbull, surgeon, had a single drachm of the tobacco in infusion injected, to assist the reduction of a strangulated hernia. She, soon after its being administered, complained of violent pain in the abdomen, and vomited. The hernia was reduced, but she died in thirty-five minutes after the use of the tobacco, and evidently from its effects.

Mr. Wheeler, senior, of St. Bartholomew's Hospital, told me he had known it destroy life, but prudently employed it in the way that I have recommended ; it is the most efficacious of the remedies proposed for the reduction of hernia.

Beneficial Effects of Tobacco.—The effect to be wished for from the use of tobacco, is a universal relaxation, so that the patient has not power to exert any of the voluntary muscles ; when this is produced, a hernia may be sometimes reduced with very little force, after having previously resisted a firm and continued pressure. Under the influence of tobacco, hernia, which has before its employment felt tense, will become soft, and this is not occasioned by any partial reduction of

the hernia, but only by the force of circulation being for a time greatly diminished.

Cold.—I have several times known the application of cold succeed in reducing a hernia, and it has this great advantage ;—that it arrests the progress of the symptoms, even when it does not ultimately succeed ; therefore, when an operation cannot be immediately performed, it should always be employed. Ice broken into small pieces and put into a bladder ; or water cooled by adding equal parts of muriate of ammonia, and nitrate of potash to it, are the most convenient modes of producing the desired effect. I have known the cold produced by the evaporation of spirits of wine and water, succeed in reducing a hernia.

Caution in applying Ice.—It is very improper to apply ice in such a manner that the patient or his bed clothes become wet as the ice melts ; it is also wrong to continue it upon the part for a long time together, as it may occasion sloughing, as occurs from the effects of frost bite. A case in which sloughing was produced in this way, was attended by Mr. Sharp, and Mr. Cline, who had directed the application of ice over a strangulated hernia, and continued it for thirty-six hours. The part, to the extent of four inches, froze, became hard and white ; the hernia was reduced, but soon after the removal of the ice, the part thawed, becoming red and inflamed ; in about ten days it assumed a lived hue, and sloughed to the extent that it had been frozen.

Purgatives.—Purgatives used formerly to be very much given, but are now little employed. Calomel given by the mouth, and a strong enema of the compound extract of colocynth, sometimes are useful.

Fomentations.—If the parts be exquisitely tender, fomentations may be employed, which if long continued, may by their relaxing effects answer the same purpose as the cold.

OF DIRECT INGUINAL HERNIA.

Sometimes a hernia protrudes nearer to the pubes than that I have just described, descending from the abdomen immediately behind the external abdominal ring, and having the epigastric artery situated on its outer side.

First observed by Mr. Cline.—Mr. Cline first observed this species of hernia, in opening the body of a Chelsea pensioner, with Mr. Adair Hawkins, on the 6th of May, 1777. The hernia was on the right side, and the mouth of the hernial sac was situated an inch and a half on the inner side of the epigastric artery. I have myself witnessed several cases of this description.

Course of.—I have carefully dissected this hernia, and found that it passed on the inner side of the epigastric artery, and protruded through the external abdominal ring, under the fascia of the cord, pushing the spermatic cord to the outer and upper part of the tumour. I traced a covering upon it, formed in part by the tendon of the transversalis muscle, and in part by the fascia transversalis ; beneath which

is situated the hernial sac. The coverings of this hernia are, therefore, the integument, the fascia of the cord, a part of the cremaster crossing obliquely the outer part of the swelling, then the fascia and tendon of the transversalis.

Differs from the oblique Hernia.—It differs from the oblique inguinal hernia in not taking the course of the inguinal canal, but in protruding directly through the external ring, and having the epigastric artery to its outer side, and in having but an imperfect covering from the cremaster, and a perfect one from the fascia transversalis and tendon of the transversalis united.

Distinguishing Marks.—The distinguishing marks between the direct and oblique inguinal hernia, are the situation of the spermatic cord, and the direction of the tumour; in the first, the spermatic cord is on the outer and upper part of the swelling, and the swelling may be traced in a direction towards the umbilicus:—in the latter, the spermatic cord is situated behind the hernia, and the inclination of the tumour is towards the spine of the ilium.

Causes.—The direct inguinal hernia may be produced suddenly from a laceration of the tendon of the transversalis, in which case the covering from this tendon will be found wanting.

Case.—A gentleman applied to me, having a direct inguinal hernia, which had appeared immediately after he had been thrown from his horse, and had fallen with the lower part of the abdomen upon a post, by which accident I imagine the tendon of the transversalis might have been ruptured.

Seldom becomes Large.—I have never seen this hernia acquire the size of the common inguinal hernia, and in most of the cases I have witnessed, the patients have had some disease of the urethra.

Case in which six Hernia existed.—In a patient of Mr. Weston's, of Shoreditch, who had for a long time laboured under difficulty in passing his urine, I found six hernia of this description, of which I have given a plate. I also found several strictures in his urethra, and a stone lodged behind one of them.

TREATMENT OF DIRECT INGUINAL HERNIA.

Truss.—When reducible, the truss employed should be longer than that applied for common inguinal hernia, as the part at which the hernia quits the abdomen, is an inch and a half nearer to the pubes. The pad of the truss should not rest on the pubes, but press principally a little above the abdominal ring, otherwise the general form of the truss may be the same.

When Irreducible.—If the hernia be irreducible, the means recommended for the oblique irreducible hernia will be proper.

When Strangulated, taxis.—When strangulated, the reduction must be attempted in a different direction to that required for the oblique. The tumour is to be grasped as in the oblique hernia, with

one hand, while the fingers and thumb of the other hand are to be placed over the abdominal ring, to knead the neck of the swelling, and the pressure must be directed upwards and inwards, instead of upwards and outwards.

Case.—In this manner I quickly succeeded in reducing a direct hernia which had become strangulated, in a patient who was admitted into Guy's Hospital, for some other complaints. The hernia was small, it had the cord to its outer side, and could not be traced higher than the abdominal ring.

Hernia apparently reduced.—This hernia may apparently be reduced by the employment of the taxis, and strangulation still exist; a case of this kind occurred a short time ago at Guy's Hospital. A man applied at the surgery, having a direct hernia strangulated, and the taxis was had recourse to, by which the gentleman in attendance thought he had succeeded in reducing the hernia, as he had pushed it through the abdominal ring. The symptoms of strangulation, however, still continued, and in two or three days the man died. On examination of his body, the hernia was found placed immediately behind the external ring, with a stricture still existing at the mouth of the sac.

OPERATION FOR STRANGULATED INGUINAL HERNIA.

When necessary.—When the means I have recommended have been tried, without enabling the surgeon to reduce the hernia, or relieve the strangulation, it becomes necessary that an operation should be performed, to liberate the strangulated viscus.

But little Danger.—There is but little danger attending this operation, if the person upon whom it is to be performed be free from other disease. The cause of persons, who have undergone this operation, so frequently dying, is not to be attributed to the operation, but to the degree of mischief which has taken place previously to its being performed.

Gangrene.—When strangulation has existed for a long time, the contents of the hernia either become gangrenous, or in a state so nearly approaching to it, that they do not recover their proper functions, otherwise inflammation extends from the strictured portion to the viscera, within the cavity of the abdomen, and thus the surgeon has to combat with a severe disease after the removal of the strangulation. The danger is therefore in the delay, and not in the operation.

Danger of delay.—Very frequently much time is unnecessarily lost, before an operation is proposed; and too much cannot be said in condemnation of such practice. A patient is submitted again and again to the taxis, and the swelling is rendered extremely tender, by being so often compressed, in the hope of avoiding an operation, until at length the rapid increase and urgency of the symptoms point out the impropriety of such delay; and an operation is performed when but little prospect of success remains.

It is extremely important that the operation should, if possible, be performed before the abdomen becomes tender under pressure. Distention of the intestines from flatus, often produces tension of the abdomen, soon after strangulation has occurred; but still the patient can bear pressure without experiencing pain; but when he does complain of pain under pressure, it indicates the extension of inflammation to the cavity of the abdomen, which is likely to be much increased by the operation.

Progress of Inflammation varies.—The progress of inflammation, and extent of mischief, are not always in proportion to the time that strangulation has existed, for the period between the commencement of the symptoms, and the fatal termination, varies exceedingly.

Small Herniæ more frequently require Operation.—A large hernia when completely strangulated, is more quickly fatal than a smaller one; but the latter more frequently requires the performance of an operation, on account of the greater firmness of the stricture.

Intestinal Hernia most Dangerous.—A hernia containing a portion of strangulated intestine alone, is more rapidly fatal than one containing omentum only; and that containing both intestine and omentum, takes a middle course between the two above mentioned.

Old Herniæ most likely to be reduced.—When a hernia has existed for a long time, and become strangulated, the attempts at reduction will be more likely to succeed than if it were of recent formation; in the first instance, the parts are more easily relaxed, having been accustomed to repeated dilatation; while in the latter case, the powers of resistance are much greater.

Also in very Old or Young Persons.—Also in very young, or very old persons, strangulated herniæ are more frequently reduced, than when they occur at the middle period of life, during which the fibrous structure is firmer, and the muscular strength greater than at any other period. In very old persons, also, the strangulation is not so rapidly fatal; as long a period as twenty days have been known to elapse between the commencement of the symptoms, and the death of the patient.

OF THE OPERATION FOR INGUINAL HERNIA.

Bladder to be emptied, and parts cleansed.—Previous to the operation, the patient should be directed to empty his bladder, and the integument upon the tumour and surrounding parts, must be cleansed from the hair usually covering it.

Position of the Patient.—The patient is then to be placed upon a table, about three feet six inches in height, on his back, the shoulders should be raised, and the thighs a little flexed towards the body, so as to relax the abdominal muscles; the hams are to be brought to the edge of the table, so that the legs may be allowed to hang over it.

Operation.—The surgeon should now place himself between the patient's thighs, and grasp the tumour with his left hand, so as to put

the integument covering it upon the stretch, and then having a scalpel in his right hand, he should commence the operation by making an incision through the skin, on the anterior part of the swelling, which incision should be begun opposite the upper part of the external abdominal ring, and carried down to the inferior part of the tumour, unless the swelling be of a large size. Besides the skin and cellular substance, the external pudendal artery may be divided by this incision, as it always crosses the sac near the abdominal ring. The hæmorrhage from this vessel may usually be stopped by pressure; but if very troublesome, it will be necessary to put a ligature upon it.

Fascia of the Cord exposed.—By this incision the fascia of the cord becomes exposed, which generally forms the thickest covering of the hernia. This must be carefully cut through in the centre, so as to admit the entry of a director which is to be passed under the fascia, upwards to the ring, and downwards to the extent of the external incision, that the fascia may be safely divided upon it.

Cremaster exposed.—Thus the cremaster muscle is brought into view, forming the next covering, which must be opened and divided in the same manner as the fascia, and with equal care, and the cellular tissue beneath must be cautiously cut through.

Hernial Sac exposed.—When this has been completed, the hernial sac itself is laid bare, and the surgeon must proceed with the utmost caution to open it in the following manner. He first nips up a small portion of the membrane on the anterior and inferior part of the tumour, between his fore-finger and thumb of the left hand, and slightly rolling the membrane between them, he easily distinguishes if any intestine or omentum be included; and if so, he raises a fresh portion. Being satisfied that he has only a part of the sac raised, he is to place the edge of the knife horizontally against it, and make an opening of sufficient size to admit the end of a director, which is then to be introduced, that the sac may be opened upon it.

Caution in Dividing the Coverings.—In dividing the different coverings, a very cautious operator will make more layers than I have described, being fearful of doing mischief which might be irreparable.

Appearance of the Sac.—When the hernial sac is exposed, it has usually a bluish tint, and is semi-transparent. If the contents be not adherent to the sac, it generally contains a quantity of fluid, and a sense of fluctuation may be usually perceived at the inferior and anterior part of it, for which reason this part should be first opened, as the intestine is there in the least danger.

Escape of Fluid.—Immediately the sac is opened, this fluid escapes. If the strangulation have not existed long, it is occasionally of a serous colour, but more frequently of a darker, or coffee colour, and sometimes it has an offensive smell.

Quantity of Fluid.—This fluid is most abundant in intestinal hernia, and is in quantity in proportion to the bulk of intestine strangulated. If, however, the hernia be omental, or if the intestine adhere

to the interior of the sac, little or no fluid is found, so that it must not always be looked for as an indication of the sac being opened.

Sac opened.—The sac being opened, the surgeon is enabled to see its contents, which he must attentively examine. If both intestine and omentum have been strangulated, the latter is found above and anterior to the former; in some instances covering the gut partially, in others completely.

Appearance of Omentum or Intestine.—If the hernia has not been long strangulated, the omentum has much of its usual character, being only a little darker than natural, and having its veins distended; but the intestine is found covered with a thin coat of adhesive matter, and is of a red colour. When the strangulation has existed for a long time previous to the operation, or when the stricture has been unusually tight, the intestine presents a dark brown chocolate colour.

Seat of Stricture ascertained.—The surgeon should now pass his finger into the hernial sac, and examine accurately the seat of the stricture, which he will find in one of the three following situations:—

First, at the internal abdominal ring, in the mouth of the sac.

Second.—In the inguinal canal, an inch, or an inch and a half within the external ring.

Third.—At the external ring.

At the Internal Ring.—The most frequent seat of stricture is at the internal abdominal ring, from an inch and a half to two inches above, and outwards from the external ring, and it is occasioned by the pressure of the internal oblique and transversalis muscles upon the mouth of the hernial sac, which becomes thickened, more especially on its pubic side.

How exposed.—Should the stricture be situated at this part, it has been thought necessary to divide the external ring, and to slit up in part the inguinal canal by dividing a portion of the tendon of the external oblique muscle, in order to give the operator a distinct view of the protruded parts, and to enable him to divide the stricture without danger to his patient. This may be done by passing the finger into the sac, through the external ring, as far as the seat of stricture, and then introducing a curved bistoury with a probed extremity between the upper part of the finger and the sac and cutting through the tendon, superficial fascia, and integument, forming the anterior boundary of the inguinal canal.

Having thus exposed the contents of the hernial sac as far as the seat of stricture, the operator should insinuate the point of his finger, or a director, under the stricture, between the sac and its contents at the upper part, carefully keeping the latter from turning over the finger or director. He should then pass the knife for dividing the stricture upon the finger or director, under the stricture, and by a gentle motion divide the stricture in a direction parallel with that of the linea alba, and to an extent sufficient to allow the finger to be easily passed into the cavity of the abdomen. The knife should then be withdrawn in a careful manner. In this case I have adopted with advantage the fol-

lowing plan :—The sac being opened to the external ring, I have put my finger into it, and hooked down the sac ; I have then directed an assistant to draw up the tendon of the external oblique at the ring, and have been thus able to bring the stricture into view without cutting the tendon of the external oblique to the upper ring.

Knife for Dividing the Stricture.—The knife best adapted for dividing the stricture is blunt at its extremity for about a quarter of an inch, sharp for half an inch, and then again blunt, only cutting so far as is necessary to divide the stricture, without endangering the neighbouring parts.

Stricture in the Inguinal Canal.—The second seat of stricture is in the inguinal canal, and is formed by the sac itself in the following way :—a person becomes the subject of oblique inguinal hernia, and the pressure on the neck of the hernial sac at the internal ring, creates a thickening of the sac at this part. From any sudden exertion or straining, which occasions a further protrusion, this part of the sac is forced into the inguinal canal, and when the patient is in the recumbent position, part or the whole of the contents of the sac being returned into the cavity of the abdomen, the portion of the sac which had been previously situated at the internal ring, and had been thickened, again takes its former position. This occurs again and again ; but at length the sac becoming elongated, the thickened portion which had been originally placed at the internal ring, no longer returns to this situation when the contents of the sac are reduced ; but it remains in the inguinal canal, and may here at any future time be the cause of strangulation.

How exposed and divided.—When the stricture is thus formed, the surgeon should freely expose the contents of the hernial sac as far as the stricture, and then divide it in the same manner, and in the same direction as before described.

Stricture of the External Ring.—Sometimes, but rarely, the seat of stricture is at the external abdominal ring, in which case the same plan of dividing the stricture should be adopted ; but it is not necessary to make so large an opening.

If the hernia be direct, it is to be remembered that the spermatic cord is placed on its outer side. It is covered by the fascia of the cord, by the cremaster partially, and is contained in a sac formed by the tendon of the transversalis muscle, assisted by the fascia transversalis, besides a peritoneal sac, as in other hernia.

Best Direction for Dividing the Stricture.—The division of the stricture directly upwards is then applicable to every common case of strangulated inguinal hernia whether oblique or direct ; it is equally safe with any other division that has been proposed, and the operation is by it more simplified than by adopting a different mode of dividing the stricture for each variety.

LECTURE XXXIII.

Examination of Viscera.—AFTER having sufficiently divided the stricture, the surgeon should carefully examine the protruded intestine, particularly that part which has been immediately under the stricture, and ascertain whether the circulation becomes restored, which he may do by employing pressure to empty the vessels, and then observe if they be again immediately filled.

Should the circulation be free, he should then gradually and very carefully return the intestine by small portions at a time, until the whole is reduced. At this time the patient should be placed much in the same position as when the taxis is employed.

Adhesions.—When adhesions have taken place between the intestine and sac, great care is required in opening the latter, as little or no fluid exists in it, to separate it from the intestine, which may be in consequence easily wounded. The sac being opened, if the adhesions be found long, and not very numerous, they may be divided to allow of the return of the protruded part. Sometimes these adhesions are only found at the mouth of the sac, or are otherwise partial; in either case they should be carefully separated, that the hernia may be completely reduced; but the division of such adhesions, particularly at the mouth of the sac, is attended with considerable danger. Sometimes the sides of the fold of intestines which has been strangulated are found glued together: in this case it is best to separate such adhesion, if it can be easily done, as the free passage of the fæces is afterwards interrupted, if the intestine be returned doubled back into the abdomen with such adhesion remaining.

Intestine Gangrenous.—Should the intestine be in a state of gangrene, it will have a fetid smell, the peritoneal surface will have lost its brilliancy, and be of a dark port wine colour, with greenish spots on it: it will not possess any sensibility, and will easily give way under slight pressure.

Treatment of Gangrenous Intestine.—Under these circumstances, the stricture should be divided in the manner I have described, after which a free incision should be made into the gangrenous intestine, to allow of the escape of its contents, and then it should be returned to the upper part of the sac, the wound should be left open, and a poultice applied; but if the portion of intestine which has descended be not large, it should not be disturbed from its adhesions to the sac.

Case.—I was requested, during the absence of Mr. Chandler, to operate upon a woman who had been admitted into St. Thomas's Hospital, under his care, with strangulated hernia. From the examination of the part, and from the history of the case previous to my seeing the patient, I imagined that gangrene had commenced, and I soon found this

opinion to be correct ; for before I had opened the hernial sac, there was a highly offensive and putrid smell. On opening the sac, I found the intestine in the state I have before described ; I therefore divided the stricture, and then made an incision of about an inch and a half in extent, on the anterior part of the gangrenous intestine, through which the fæces readily escaped. I afterwards directed a poultice should be applied. Fæculent matter continued to be discharged through the wound ; but nine days subsequent to the operation she had a stool, per anum, after which the patient passed her stools by the natural passage, occasionally at first, then more frequently, as the artificial anus and wound closed, and she completely recovered. This patient was confined five months after the operation, and delivered of a full grown but dead child, by Mr. Brown, a respectable surgeon at Rotherhithe. It is extraordinary, that being considerably advanced in her pregnancy at the time of the operation, she did not miscarry.

Termination without an Operation.—When a patient with strangulated hernia will not submit to the operation necessary for his relief, or if the proper assistance cannot be procured, and gangrene takes place, the hernia sometimes suddenly returns into the cavity of the abdomen, and the patient survives only a few hours. Sometimes the skin and other coverings inflame and slough, when the fæces are discharged through the opening thus produced, and the symptoms of strangulation subside, after which an artificial anus is formed, rendering the remainder of the patient's life miserable.

Artificial Anus.—Occasionally, however, it happens that the external wound and artificial anus are gradually closed, and the patient entirely recovers.

Case.—A case of this kind occurred under the care of my friend, Mr. John Cooper, surgeon, of Wotton Underedge, Gloucestershire. He was requested to attend a poor woman, aged sixty, who was the subject of strangulated crural hernia. When he first saw her, she had been labouring under symptoms of strangulation for a fortnight, and the hernia was evidently in a state of mortification. Thinking, therefore, that there would not be any chance of saving her life by an operation, he only directed that her strength should be supported, and the part poulticed. In a few days the mortified parts began to separate, and the fæces were discharged through the wound. This continued for three months, during which period several inches of one of the small intestines sloughed. After this, a small quantity of fæces began to pass by the natural channel, and in six months the woman had perfectly recovered.

Danger of.—The formation of an artificial anus is dangerous, according to its situation in the intestinal canal. If the opening be near to the stomach in the jejunum, the patient will die in consequence of the small surface for the absorption of chyle being inadequate to produce sufficient nourishment. If the opening be in the lower part of the ilium, or in the colon, then the patient may recover, as there is but little interruption to nutrition.

Case.—A man about fifty years of age was admitted into Guy's

Hospital, with a strangulated umbilical hernia, which sloughed, and occasioned an artificial anus. As he was recovering from the effects of the strangulation and sloughing, and was allowed to take food in any considerable quantity, it was observed that part of what solids he ate passed out at the artificial anus, within half an hour after he had swallowed them, and that fluids passed out in ten minutes after they had been taken into the stomach. Although he took sufficient food to support a healthy person, he wasted rapidly, and died in three weeks. On examining his body after death, and tracing the jejunum, the lower part of that intestine was found entering the hernial sac, and in it the opening was situated. The other viscera were healthy.

From Inversion of the Intestine.—When an artificial anus has been formed, care must be taken to guard against any inversion of the intestine at the artificial opening, as such an occurrence will most likely prevent the perfect recovery of the patient, by rendering the false opening permanent.

Case.—A patient of Mr. Cowell's, in St. Thomas's Hospital, underwent the operation for a strangulated hernia; the intestine was found to be gangrenous, and the consequence was the formation of an artificial anus. For three weeks after the operation, the fæces passed in part by the artificial opening, and in part by the natural aperture, but most by the latter; at this period the intestine became inverted, and protruded at the artificial opening; after which the fæces were entirely discharged by the false passage. The man lived eleven years after this, but always discharged his stools by the artificial anus.

Appendices Epiploicæ removed.—If a portion of the colon has been strangulated, and the patient be fat, the appendices epiploicæ are sometimes found much more diseased than the intestine, so much so, that it becomes necessary to remove them, which I have had occasion to do.

Examination of Omentum.—Having returned the intestine, the surgeon should carefully examine the omentum, and if it be not in a large quantity, or of an unhealthy appearance, it should be returned into the abdomen, with as gentle a pressure as possible. If a very large portion of omentum be protruded, a part should be removed, which may be done without any danger to the patient by means of the knife; and, if any arteries sufficiently large to afford a troublesome hæmorrhage, are divided, they must be secured by fine ligatures; the divided surface should then be returned to the mouth of the sac, so as to form a plug, and the ligatures should remain hanging from the external wound.

Use of the Ligature abandoned.—The old mode of applying a ligature around the protruded portion of the omentum to occasion it to slough off, is now, I believe, entirely abandoned; and it appears extraordinary, that it should ever have been adopted, as it is the object of the operation to remove the stricture, which would be thus immediately restored with increased severity.

Omentum mortified.—If the omentum be in a state of mortification,

which may generally be known by its crispy feel, and the distension of its veins by coagulated blood ; or even if any suspicion arise of its being in an unsound state, it should be removed by excision at the sound part. In doing this, the strangulated portion should be drawn down a little, so as to expose some of the sound part, which should be held by an assistant to prevent its sudden retraction into the abdomen, while the surgeon cuts off the diseased part ; and when this has been completed, any bleeding vessels should be secured as before directed. Should the omentum, in an unsound state, approaching to gangrene, be returned into the cavity of the abdomen, the danger of the patient will be much increased.

Sloughing of Omentum.—*Case.*—I have, however, known a patient recover, in whom sloughing of the omentum took place after it had been returned into the cavity of the abdomen. This occurred in a man who had undergone the operation for a strangulated hernia in Guy's Hospital. The sac contained both intestine and omentum ; and the latter, although much changed in appearance, was returned into the abdomen. Some days after the operation, the man appeared to be dying ; the ligatures, holding the edges of the wound together, were removed, and poultices and fomentations employed, when, on the following day, a portion of gangrenous omentum was found protruding from the wound, and for several days more continued to present itself, until the whole of the portion which had been previously strangulated was exposed, and gradually sloughed off ; after which the patient recovered.

Omentum adherent.—When the omentum alone adheres to the sac, it may be freely separated and returned, any vessels likely to afford a troublesome hæmorrhage being previously secured.

Omentum hard like Scirrhus.—Should the protruded omentum be much hardened, or have a scirrhus feel, it should also be removed in the same manner as I have already described.

TREATMENT AFTER THE OPERATION.

Employment of Sutures.—When the contents of the hernial sac have been returned into the cavity of the abdomen, the wound should be well cleansed, and its edges should be afterwards brought into contact by means of sutures, in order to promote adhesion, two or three sutures being necessary, according to the extent of the wound. Care should be taken in passing the sutures only to include the integument ; otherwise, by penetrating the sac, much subsequent mischief may arise.

Of Plaster.—The approximation of these parts should be assisted by the application of slips of soap plaster, and a compress should be placed over the wound, and retained there by means of a T bandage, to close the orifice of the sac, and prevent any further protrusion into it, and at the same time the scrotum should be well supported.

Position in Bed.—The patient should then be carried to bed in a horizontal position, and placed with his shoulders a little elevated, and the thigh, on the same side as the wound, moderately flexed towards the abdomen.

Necessity of the Recumbent Position.—As it is perfectly necessary that the patient should keep the recumbent position during the cure, a folded sheet must be placed under him, into which he should discharge his stools, otherwise should he rise to use the night-chair, much mischief may arise from the effort. Mr. Cline had operated upon a patient for strangulated hernia; and some hours after the operation the patient got out of bed to use the night-chair, and from the exertions he made in getting up and in passing his motion, the intestine, which had been reduced, again descended into the sac: Mr. Cline again reduced the intestine, and gave strict orders for the man to keep the recumbent position, and the patient ultimately did well.

Usually, if the patient be left to himself, he will have some natural stools in a few hours after the operation; but, if several hours elapse without an evacuation, either castor oil or sulphate of magnesia should be given, or a purgative enema, containing colocynth, or castor oil, should be thrown up, and the abdomen should be fomented with spiritous fomentation, which will assist the action of the bowels, and afford much comfort to the patient.

Medicines.—As the safety of the patient depends much upon procuring evacuations from the bowels, the exhibition of opium soon after the operation should, if possible, be avoided; but if the irritability of the stomach continue, or if the patient have a troublesome cough, it should be administered in conjunction with calomel.

Purgatives.—It is not only necessary to procure evacuations from the bowels soon after the operation, but it is extremely desirable to keep up a free action upon them for several days following; as I have frequently known patients die in a few days after the operation with constipation and peritoneal inflammation, although they had passed several stools within twenty-four hours after the strangulation had been relieved.

Sutures removed.—Should the patient go on well, the wound should be dressed on the third day, and afterwards daily. The sutures may be removed on the fourth and fifth day; but the patient must be kept in bed until the wound is entirely closed.

Operation successful.—When the operation has been performed at any early period after the strangulation has taken place, the patient generally does well; but when much time has elapsed from the strangulation of the hernia before the performance of the operation, dangerous symptoms frequently arise.

Sometimes not.—Sometimes the intestine does not recover its function, when the vomiting and constipation continue, and the patient dies.

Peritoneal Inflammation.—Sometimes peritoneal inflammation continues, in which case the abdomen is extremely tender and tense,

although the bowels are open, and the life of the patient is soon destroyed. The best means of relieving this inflammation are by local and general bleeding, fomentations, purgatives, and extremely low diet.

Diarrhœa.—Occasionally the patient is attacked with a violent diarrhœa, which continues for many days, producing so great a state of debility as to prevent recovery. In such cases, the treatment I have found most efficacious, consists in exhibiting small doses of opium frequently, and the employment of injections of starch and opium, with a light but nutritious diet, as gruel, or milk, with isinglass, &c.

Hiccough.—In a few instances, I have known a troublesome hiccough continue for several days after the operation, but entirely unconnected with gangrene, being the result of peritoneal inflammation.

Case.—The most remarkable example of this kind I ever met with, was in a gentleman at Maidstone, for whom I performed an operation upon a large strangulated intestinal hernia. The symptoms had been unusually severe, and inflammation had taken place in the peritoneum. The abdomen continued tender to pressure for several days after the operation, and the hiccough continued until the sixth day. The patient was bled and purged freely, and he eventually recovered. As this symptom depends upon inflammation of the peritoneum when gangrene has not taken place, the proper means of relieving it are the same as directed for the inflammation of this membrane, as local and general bleeding, purgatives, &c.

The Operation does not Prevent a Future Protrusion.—The performance of the operation for strangulated hernia does not prevent the future descent of the intestine or omentum, but perhaps renders the patient more liable to its recurrence, as the mouth of the sac is by the operation considerably enlarged. It is, therefore, perfectly necessary before the patient be allowed to get up, or use any exertion, that he should be fitted with a truss, which will effectually prevent any protrusion, by keeping the mouth of the sac closed, otherwise he may in a short time again become the subject of strangulated hernia.

Truss to be again applied.—When the truss is first applied, a dossil of lint should be placed under the pad, to protect the recently healed wound.

Removal of the Sac recommended.—In consequence of a radical cure not being produced by the operation I have described, some persons have recommended the removal of the hernial sac by excision or ligature, or that it should be returned into the abdomen.

Case.—In a patient of Mr. Holt's, at Tottenham, I had an excellent opportunity of seeing the effects of removing the sac by excision. A woman, who, for several years, had been subject to femoral hernia, applied to Mr. Holt, on account of the swelling having become so painful and tender as to prevent her from following her ordinary occupations, although the bowels appeared to act very regularly. Mr. Holt requested me to visit the patient with him, and I made many ineffectual attempts to reduce the hernia, and in a few days afterwards I

recommended Mr. Holt to operate, as the symptoms had not in the least subsided. On opening the hernial sac, a small portion of intestine was found at the mouth of the sac, inflamed, and adherent to it. Mr. Holt carefully separated the adhesions, and returned the intestine into the abdomen. The sac itself being but little attached to the surrounding parts, I requested Mr. Holt to allow me to remove it, which I did, close to the mouth of the sac. I then closed the orifice by sutures, and the external wound was treated in the usual way. On the sixth day, the ligatures came away, and the wound was closed on the tenth. I saw this woman a month after the operation, when she had a hernia nearly as large as the one for which the operation had been performed, and at the same spot; she was subsequently obliged to wear a truss constantly, to prevent the protrusion of this hernia.

Removal of the Sac not successful.—From this it appears that the removal of the sac will not prevent the re-formation of a hernia, nor do I think, upon reflection, that it scarcely could be expected to do so, as the aperture from the abdomen remains equally large, and the peritoneum alone offers resistance to the formation of another hernia, and this had been insufficient to prevent the protrusion of the first.

Objection to removal of the Sac by a Ligature.—The removal of the sac by ligature is equally objectionable, even if it could be done without risk, which it hardly could, more especially in oblique inguinal hernia, as the ligature ought, in such cases, to be applied close to the internal ring, which could not be done without a very tedious and hazardous dissection; besides, the spermatic cord is sometimes divided by the sac, which would increase the difficulty and danger of such an operation.

Danger of.—The great danger of this operation is in the inflammation, which is likely to be induced by the action of the ligature upon the peritoneum, and in this inflammation extending to the cavity of the abdomen.

OF LARGE HERNIÆ.

Different Operation required.—In very large inguinal herniæ a very different mode of operating is required, to that which I have already described, for the following reasons:—

Difficulty of Reducing.—When a large hernia has existed for some time, the cavity of the abdomen becomes diminished, from the habitual loss of a large portion of its natural contents, and such a resistance is offered when any attempt is made to return the contents of the hernial sac, that the intestine sometimes gives way, or is lacerated from the violence employed in attempting to reduce it, and even if it can be returned, the slightest exertion will occasion a further protrusion.

Danger from the Taxis.—Also, in large hernia, a considerable extent of protruded intestine being submitted to much violence in the

attempt to reduce it, often gives rise to inflammation, which may produce fatal consequences.

Extensive Adhesions.—Sometimes extensive adhesions have been formed between the sac and protruded intestine, or the portion of peritoneum which has descended, and is forming part of the sac, may have brought with it a portion of the intestine, to which it is naturally closely connected, as the cœcum, and which thus becomes irreducible: in either case the reduction of the hernia is of course prevented.

Mode of Operating.—Instead of performing the same operation, as in other cases, I should, under these circumstances, merely expose the upper part of the hernial sac, and divide the stricture without opening the peritoneum, unless the stricture happened to be seated in the mouth of the sac itself.

Case.—The first time that I had an opportunity of performing the operation in this manner, was upon a patient of Mr. Birch's in St. Thomas's Hospital. The man was between fifty and sixty years of age, and had been subject to a hernia from his infancy, which, becoming strangulated, and not yielding to the usual measures, rendered an operation necessary. From the size of the hernia, which reached half way to the knees, and its duration, I conceived that such adhesions might have occurred as would render its reduction impossible, and that the ordinary mode of operating would be extremely hazardous, on account of exposing so large a surface of intestine; I therefore determined upon trying what could be effected by a division of the stricture, without opening the hernial sac.

Operation.—I commenced by making an incision, beginning about one inch and a half above the external abdominal ring, and terminating about the same distance below it; this exposed the tendon of the external oblique, and the fascia of the cord. I then carefully made an opening into the latter, large enough to admit a director, which I introduced, and upon it divided the fascia so as to expose the cremaster muscle as far as the external ring; after this I passed the director between the cremaster and edge of the external ring, and introducing a probed bistoury, I cut through a part of the tendon of the external oblique, so as to enlarge the external ring. On passing my finger into the inguinal canal, to the edge of the transversalis muscle, I felt some further resistance; and again introducing the director, I carefully separated some fibres of this muscle. The contents of the hernial sac were then reduced, and the edges of the wound being approximated, the patient was put to bed.

The wound healed kindly in about three weeks, although the hernia was protruded upon the slightest exertion, which would have occasioned much irritation, had the sac been opened. The patient was subsequently obliged to wear a laced bag truss.

Division of the Stricture.—Should the stricture be seated in the neck of the hernial sac itself, of course the division of the parts exterior to it, will not relieve the strangulation; in this case the sac must be opened carefully at the upper part only, so as to allow of a division of the stricture.

Care in Returning the Viscera.—Having divided the stricture, the surgeon must avoid violence in attempting to return the protruded parts, for the reasons I have before mentioned. I have known the intestine ruptured in forcibly endeavouring to effect the reduction after the liberation of the stricture. The case occurred in St. Thomas's Hospital, and terminated fatally. The ruptured intestine is preserved in the collection at that Hospital.

Some surgeons object to the division of the stricture without opening the hernial sac, urging that the intestine or omentum may be in a gangrenous state, and that this cannot be ascertained unless the sac be opened; but I should imagine that a very limited experience would enable the surgeon to form an accurate opinion in this respect.

OF HERNIÆ IN THE INGUINAL CANAL.

Appearance.—The oblique hernia is sometimes confined entirely to the inguinal canal, and does not emerge through the external ring. It is often difficult to detect in the living subject, as there is no distinct tumour perceptible, but merely a fulness above Poupart's ligament. When strangulated, the usual symptoms are present, and the part is very tender on pressure, or during coughing.

Coverings.—This hernia is covered by the superficial fascia, the tendon of the external oblique muscle, by a thin fascia from the edge of the internal ring, and in part by the cremaster muscle, the spermatic cord and the epigastric artery lie posterior to it.

Mistaken.—These herniæ, when strangulated, are often mistaken for cases of peritoneal inflammation, as the patient is not conscious of having a swelling; and thus he may fall a victim to the disease, without a suspicion of its true nature.

Case.—A patient was admitted into St. Thomas's Hospital, with a hernia of this description, strangulated, which was treated as peritoneal inflammation, for five days before the true nature of the complaint was discovered. There was a fulness above Poupart's ligament, which was painful on pressure or during coughing; and on pressing the part, a small tumour appeared at the external ring, which disappeared when the part above was not pressed.

The operation was performed, and a portion of the circumference of one of the small intestines was found strangulated, but not gangrenous. Although the strangulation had existed for so long a period, and the patient had suffered from hiccough, and extreme tenderness of his abdomen, yet he ultimately recovered.

Mode of Operating.—The mode of operating in these cases is as follows:—The hair having been removed from the part, and the patient being placed in a convenient position, an oblique incision is to be made, commencing at the upper part of the swelling, about midway between the anterior superior spinous process of the ilium and symphysis pubis, and terminating a little above the external abdominal ring. This incision should divide the integument and superficial fascia, and expose the tendon of the external oblique muscle, which is to be carefully cut

through in the same direction, when the hernial sac will be seen covered by a very thin fascia, which is given off from the upper aperture. Part of the cremaster muscle is also found covering the lower part of the sac. The sac is to be opened with the usual precautions, and the stricture, which will be found at the upper orifice, is to be carefully divided upwards, by first passing a small director under it, and then introducing the hernia knife upon the director.

Hernial Sac returned.—The return of the hernial sac into the cavity of the abdomen has been recommended in this form of hernia; but it does not appear that any advantage is gained by it, independent, in many cases, of the difficulty of effecting it.

Cases.—Mr. Weld, junior, surgeon, at Romford, having occasion to perform an operation upon a woman, on account of the strangulation of a hernia of this kind, after liberating the stricture, returned the sac into the abdomen. The woman recovered, but some time after became the subject of hernia at the same spot, as she would not wear a truss after the operation.

I am indebted to my friend Mr. Thomas Blizard, for the following curious and interesting case of hernia, descending behind the spermatic cord, which had been accompanied with hydrocele, in the tunica vaginalis of the same side.

The patient had been the subject of hernia on the right side, for six years, for which he had worn a truss; and from his own account a hydrocele had formed on each side, two years previous to his coming under the care of Mr. Blizard; but that on the right side had gradually disappeared, leaving the testis wasted and drawn up to the groin.

The hernia becoming strangulated, and not yielding to the usual means employed for reducing it, Mr. Blizard performed the operation about twenty-four hours after the commencement of the symptoms. Having laid bare what he thought was the hernial sac, he punctured it, and then freely opened it upon the director. It extended through the external ring, into the inguinal canal, which Mr. Blizard in part cut open, in order to make the necessary examination of what he conceived to be the hernial sac; this, however, proved to be the tunica vaginalis, which had formerly been distended by the hydrocele, having the hernia seated behind it. The posterior part of this tunic was then cut through, exposing the hernial sac, which was found to contain a portion of intestine nearly of a black colour, from strangulation. The stricture which was seated at the mouth of the sac was divided in the usual manner, and the intestine returned. The patient did well. Mr. Henry Cline had occasion to operate upon a similar case.

OF INGUINAL HERNIA IN THE FEMALE.

Structure of Parts.—The structure of the inguinal canal in the female is very much the same as that which I have described in the

male, only that the round ligament in the former takes the place of the spermatic cord existing in the latter.

Round Ligament.—The round ligament, which commences at the fundus uteri, passes from the abdomen midway between the anterior superior spinous process of the ilium to the outer side of the epigastric artery, above Poupart's ligament, and below the transversalis and internal oblique muscles, as the spermatic cord in the male; it takes a course obliquely downwards, and inwards to the external abdominal ring through which it passes, and is lost upon the pubes.

This round ligament, however, being much smaller than the spermatic cord of the male, passes through openings corresponding to its size, which are consequently much less than those for the spermatic cord, and on this account the formation of inguinal hernia in the female is of comparatively rare occurrence.

Course of the Hernia.—When this hernia does occur in the female, it takes the course of the round ligament, is at first confined to the inguinal canal, where it is covered by the tendon of the external oblique, and subsequently it protrudes through the external ring, and forms a swelling at the upper part of the labium, which seldom acquires a large size; here it is covered by a superficial fascia given off from the tendon of the external oblique.

Causes.—It is produced by the same causes in the female as in the male, and presents the same symptoms. The sac usually contains either intestine or omentum, or both, but sometimes the appendages of the uterus are found in it.

Less liable to mistake than in the Male.—As the round ligament in the female is not liable to the same affections as the spermatic cord of the male, the hernia in the former case is not likely to be confounded as it frequently is in the latter case with such diseases. I have, however, known this form of hernia in the female mistaken for a femoral hernia, which may readily be imagined when we recollect the proximity of the parts concerned.

How distinguished from Femoral.—A careful examination will readily enable the surgeon to distinguish between the two, as in the inguinal, the neck of the tumour is above Poupart's ligament and in the femoral below; in the former, also, the spinous process of the pubes can be readily felt outside the swelling, which it cannot be in the latter.*

Reducible.—When this hernia can be reduced, a truss, similar to that necessary for a male, is to be employed.

Irreducible.—When irreducible, the same treatment as recommended for the male will be proper. If intestinal and small, a truss with a hollow pad; if omental, a common pad; and when the hernia is very large, a T bandage, to give support, and prevent increase.

Strangulated.—Should this hernia become strangulated, the taxis should be first employed in the same way as in the other sex; and

* Another good diagnostic mark is in the direction of the impetus given to the swelling, when the patient coughs or sneezes; in inguinal hernia being downwards, and in femoral, upwards from the thigh.—T.

should this not succeed, bleeding, the warm bath, ice, the tobacco enema, or other means to assist reduction, should be had recourse to.

The usual means having failed to relieve the strangulation, an operation becomes necessary, which should be performed in the following manner.

Operation.—The hair having been removed from the surface of the tumour, and the patient being placed in the same position that I directed the male should be under similar circumstances, the surgeon should make an incision through the integument, commencing a little above the external abdominal ring, and terminating at the lower part of the swelling. This exposes the fascia covering the hernial sac, which should next be carefully divided to the extent of the first incision. The sac, being thus laid bare, should first be cautiously punctured as before mentioned, and then should be further opened upon the director.

The portion of the hernial sac below the external abdominal ring may perhaps contain only a quantity of the dark serum usually found ; in which case the operator must introduce his finger into that part of the sac which is in the inguinal canal, and there he will feel the portion of intestine or omentum which is strangulated. He should then slit up the canal and sac towards the anterior superior spinous process of the ilium, so as to expose the strangulated parts ; and, ascertaining the seat of stricture, he should pass a small director under it, and carrying the hernia knife upon the director, the stricture should be divided upwards, or upwards and outwards, after which the protruded parts are to be returned, if they be not in a state of gangrene.

The last case of inguinal hernia in the female, in which I had an opportunity in witnessing the operation was under the care of Mr. Forster, in Guy's Hospital.

Case.—Upon opening the sac below the external ring, a quantity of fluid escaped, but there was not any appearance of intestine or omentum. However, upon passing the finger into the sac, through the external ring, a portion of intestine could be distinctly felt, which Mr. Forster subsequently exposed, by slitting up the inguinal canal. The stricture, which was seated at the internal ring, was divided upon a director in the usual manner, and the patient did extremely well.

After-treatment.—The after-treatment does not differ from that I have directed for the other sex.

In the Inguinal Canal.—When the inguinal hernia in the female has not descended through the external ring, it may become strangulated, and occasion fatal consequences, as in the male, without its existence having been recognised during the life of the patient.

Case.—A patient was admitted into St. Thomas's Hospital, under the care of Sir Gilbert Blane, with symptoms of strangulated hernia ; but, upon being closely questioned by Sir Gilbert, she denied the existence of any tumour at the groin, naval, or elsewhere, and the case was consequently treated as one of inflammation. The woman died ; and Sir Gilbert, supposing that some concealed hernia might have been the cause of her death, inspected the body, and found a small strangulated

inguinal hernia on the right side, which did not protrude an inch from the internal ring.

Operation.—When necessary, the operation in this case is similar to that required for the same disease in the male.

I have never seen direct inguinal hernia in the female.

OF CONGENITAL HERNIA.

No proper Sac.—In this hernia the protruded parts have not any proper peritoneal sac, as the common inguinal hernia, but are contained in the tunica vaginalis of the testicle. All herniæ seated in this cavity are not, however, congenital, as such protrusion may occur at the adult period for the first time.

Origin.—This hernia is originating from the descent of the testicle in the foetus. Usually about the seventh month, the testicles, which are up to that period seated upon the loins, begin to descend into the scrotum. At this time, a strong ligament is found connected with the inferior part of the testis and epididymis, and passing to the scrotum in the same direction as the spermatic cord is afterwards placed; it is called the gubernaculum, and appears to guide the testicle into the situation provided for it.

The testicle and its vessels are covered by peritoneum, except just where the latter enter at the posterior part of the former.

Descent of the Testicle.—In its descent, the testicle takes with it a portion of peritoneum, which afterwards becomes the tunica vaginalis: and it is usually found in the scrotum at the ninth month; but there is considerable variety as to the period when the descent is complete, sometimes being earlier or later than the ninth month, sometimes one testicle comes down first, and the other does not descend till some time afterwards. In some cases, the testicles never quit the abdomen, and in others they only descend to the groin.

When the testicle has reached the scrotum, the opening through which it quitted the abdomen generally closes, but at what period is not precisely ascertained. If, however, it should remain open at the time of birth, the efforts of the child in breathing or crying cause the protrusion of a small portion of intestine into the cavity, and thus the congenital hernia is formed.

Called the Windy Rupture.—From its appearance and feel, more particularly when the child cries, the nurses call it the windy rupture, in opposition to the term watery rupture, which they apply to an hydrocele, when it occurs in the infant, and this is not very unfrequent.

Sometimes occurs at the Adult Period.—I have found the tunica vaginalis sufficiently open at the adult period to admit the introduction of a female catheter; and I have known hernia, similar to the true congenital form, occur in persons between twenty and thirty years of age. In these cases I imagine the opening at first to have been so small as not to admit the descent of a hernia under ordinary circumstances, but

that when the patients have been under the necessity of doing very laborious work, or during a state of great relaxation, the protrusion has taken place.

Course.—The congenital hernia must necessarily take the course of the spermatic cord, passing in the same direction as an oblique inguinal hernia, from which it is to be distinguished by the following marks: In common oblique inguinal hernia, the testicle is perfectly distinct from the hernial sac; whereas, in the congenital disease, the testicle is confounded with the sac. In the latter case, also, the appearance of the part very much resembles that of a hydrocele; more especially if, as sometimes happens, a quantity of fluid descends into the sac with the intestine or omentum which, upon a close inspection, gives a transparent appearance to the swelling. To distinguish these joint diseases, the contents of the hernia should be returned into the cavity of the abdomen whilst the patient is in a recumbent posture; after this, a moderate pressure is to be made against the abdominal ring, with the finger, so as to prevent the descent of the intestine or omentum; if the patient then assume the erect position, the water will escape into the tunica vaginalis, but the intestine or omentum will be felt pressing against the finger above.

Sometimes the testicle does not descend to the bottom of the scrotum, and then, if a congenital hernia form, the tunica vaginalis becomes elongated, and reaches considerably below the situation of the testicle.

Division of the Cord.—In the congenital form of hernia, also, the cord is occasionally divided, the artery and vein being on one side, and the vas deferens taking its course on the other side.

Reducible.—When the congenital hernia is reducible, it requires the use of a truss, as the common inguinal hernia, provided that the testicle has completely descended into the scrotum, or does not rest at the groin. For the first three months, perhaps a pad and bandage may be sufficient to prevent the descent of the hernia; but after this period a truss with a spring may be employed with safety, or even at a younger period if necessary.

Testicle in the Groin.—If the testicle be seated in the groin, a truss cannot be worn without risk of injuring the gland, and it is better to allow of such a protrusion as will assist the complete descent of the testicle, before any truss or other means of suppressing the hernia be resorted to.

Case.—A young man who now holds a situation of importance, and who is the father of several children, was brought to me formerly by his father, on account of his having a congenital hernia; but because the descent of the testicle on the same side was incomplete, I directed that the protrusion should not be retarded. The testicle afterwards descended into the scrotum, a truss was then applied for the hernia, and the disease was ultimately subdued.

Closure of the Tunic.—After the truss has been worn for some time, the tunica vaginalis becomes closed at the upper part, and near

the testicle, but sometimes remains open between, allowing a space for the deposit of fluid which occasionally takes place, forming hydrocele of the cord, and for the cure of which I have had to perform an operation on several occasions.

Irreducible.—With regard to the treatment of this hernia in the irreducible state, the same as directed for common inguinal hernia, is here applicable; and when strangulated, the same means as recommended in the latter case, should be employed for the relief of the patient.

Operation.—When an operation is required, it should differ from that described as necessary for common oblique inguinal hernia, in the following particular. Having laid bare the tunica vaginalis, it should not be opened low down on account of exposing the testicle, but a sufficient quantity of the tunic should be left whole to cover this gland.

Large Quantity of Fluid.—On opening the tunica vaginalis, a much larger quantity of fluid generally escapes than is found in the sac of a common inguinal hernia.

Seat of Stricture.—The seat of stricture will be generally found under the edge of the transversalis muscle, or at the internal ring, when it should be divided in the same manner as in other cases of hernia; after which, the protruded parts, if not adherent, should be returned. If extensively adherent, the stricture should be divided in the same way, but the surgeon should not attempt to separate the adhesions, unless very few and slight, in order to allow of the return of the parts; but they should be left; and after the wound has healed, a bag-truss will be required, as for other irreducible scrotal herniæ.

In operating for this form of hernia, the testicle is sometimes found in the inguinal canal in contact with the intestine; in which case the intestine only should be returned into the abdomen, the testicle being left in the canal. The stricture in this case is at the orifice of the tunica vaginalis.

OF ENCYSTED HERNIA OF THE TUNICA VAGINALIS.

How formed.—This is a particular species of hernia, which occurs in the following manner. The tunica vaginalis becomes closed, by adhesion, opposite the abdominal ring, but remains open above and below it; and when a protrusion of intestine occurs, this adherent portion of the tunic becomes elongated, forming a distinct hernial sac within the proper tunica vaginalis.

Case.—I had an opportunity of witnessing the following case, under the care of Mr. Forster, in Guy's Hospital. A man was admitted into the house with symptoms of strangulated hernia, which the usual means failed to relieve, and the operation was proposed and urged; but the patient would not submit, choosing rather to die. On examining his body after death, a sac was found within the tunica vaginalis,

descending from the abdominal ring towards the testicle. This sac contained a portion of one of the small intestines which had become gangrenous. The stricture was at the mouth of the sac.

Operation.—In operating upon a case of this kind, the tunica vaginalis should be opened freely, to expose the sac, otherwise some difficulty may arise.

Mr. Hey, in his Surgical Observations, has related a case similar to that of Mr. Forster.

LECTURE XXXIV.

ON FEMORAL HERNIÆ.

Anatomy of the Parts.—BEFORE I proceed to describe the symptoms of femoral hernia, I shall give an account of the anatomy of the parts directly or indirectly concerned.

Superficial Fascia.—The superficial fascia, which covers the external oblique muscle, is continued down over Poupart's ligament upon the thigh, where it is found of considerable density, and serves to keep the superficial veins and absorbent vessels in their proper situations.

Crural Arch.—Under Poupart's ligament, which stretches from the anterior superior spinous process of the ilium, to the spinous process of the pubes, is a space called the crural arch, which gives passage to the femoral artery and vein, the anterior crural nerve, and psoas and iliacus internus muscles, with absorbents, &c.

Gimbernat's Ligament.—From that portion of Poupart's ligament which is inserted into the spine of the pubes, a process is given off, extending downwards and outwards, and attached to the ligament of the pubes over the linea-ileo-pectinea; it presents a concave edge towards the femoral vein, and is known under the name of Gimbernat's ligament.

Fascia Transversalis and Iliacus.—Two fasciæ are given off above from Poupart's ligament, one passing upwards between the peritoneum and transversalis muscle, which is called the fascia transversalis; a second fascia extends between the peritoneum and iliacus, and psoas muscles, called the fascia iliaca. From another part of the fascia transversalis, a process passes down under Poupart's ligament, through the crural arch, to the sheath of the femoral vessels, forming its anterior part, and the fascia iliaca forms the commencement of the posterior portion.

Sheath of the Femoral Vessels.—In this sheath are situated the femoral artery and vein, the anterior crural nerve not being included.

The vein is placed most internal, and about five-eighths of an inch to the outer side of Gimbernat's ligament; the artery lies outside of the vein, and the nerve still more exterior. The artery and vein are separated by a septum.

Fascia Lata.—Under the superficial fascia of the groin, and extending from the inferior part of Poupart's ligament, is a strong fascia, called fascia lata, which has two attachments above, but becomes united below. One portion is joined to Poupart's ligament from the spinous process of the pubes to the anterior superior or spinous process of the ilium; and, passing downwards, covers the femoral artery and vein, the anterior crural nerve, and the muscles on the outer and fore part of the thigh.

Falciform Process.—From its origin at the spine of the pubes, a defined edge passes a little outwards and downwards, in a crescentic form, over the sheath of the femoral vessels, then curves inwards, and a little upwards, under the saphena major vein, and is united to the second portion. This second portion is connected above with the ligament of the pubes close to the insertion of the external oblique muscle; it then passes inwards and downwards upon the pectineus, adductor longus, and other muscles, to join that part which I described as passing under the saphena major vein. From the union of these two portions, the fascia lata of the thigh results anteriorly.

Between the free internal edge of the first, and the origin of the second portions, as low down as their junction under the saphena major vein, an opening is left, exposing a part of the femoral sheath. This space is filled above by absorbent glands; the absorbent vessels from which here perforate the sheath of the femoral vessels, to pass to the glands in the abdomen. At the lower part of the space, the saphena major vein penetrates the sheath to enter the femoral vein about an inch below the crural arch.

If the fascia lata be entirely removed from the upper part of the thigh, the muscles and anterior crural nerve are exposed, but the femoral artery and vein remain enclosed in their proper sheath.

Sheath Funnel-shaped.—On opening the femoral sheath, the artery and vein are exposed; the former situated to the outer side of the latter, and about three inches from the symphysis pubes. The sheath, about two inches downwards, becomes intimately connected with a portion of the fascia lata. It has somewhat a funnel-shape, being larger above, and contracted below, where it joins the fascia lata.

Epigastric Artery.—The epigastric artery, in its course upwards and inwards from the external iliac, passes from one-half to three-fourths of an inch from the opening where the absorbents enter the abdomen. There is, however, considerable variety in the origin of this vessel.

Orifice of the Sheath.—To view the orifice of the crural sheath from above, the peritoneum, which covers it, must be taken off, when the relative situations of the vessels, entering the sheath, will be distinctly seen, as also the descent of the two portions of fascia to form the sheath,

that from the fascia transversalis above the vessels, and that from the fascia iliaca beneath them.

Difference in the Male and Female Pelvis.—From the difference in the formation of the pelvis in the male and female, the space forming the opening to the femoral sheath is largest in the latter, on which account they are more liable to the formation of femoral hernia.

Commencement of the Hernia.—When a femoral hernia commences, the patient's attention is first directed to the part on account of experiencing pain on suddenly straightening the limb, as in rising from a sitting posture. This is occasioned by the extension of the fascia lata, and its pressing on the protruded parts.

Appearance of the Hernia.—On examining the seat of pain, a fulness is discovered at the upper and inner part of the femoral sheath, which disappears on pressure, or when the patient is recumbent. This fulness soon increases, so as to form a tumour about the size of a small walnut, which is situated immediately below Poupart's ligament, to the inner side of the femoral vessels, and to the outside of the spine of the pubes. As the swelling enlarges, it projects more forwards and upwards, turning up over Poupart's ligament; as it meets with the least resistance in this direction.

Like an enlarged Gland.—When the tumour is small, from its situation and circumscribed feel, it has much the character of an enlarged inguinal gland.

Direction of the Hernia.—The direction of this hernia is at first a little downwards in the femoral sheath, then obliquely inwards and forwards, and lastly upwards; sometimes, however, instead of turning up over Poupart's ligament, it takes a course downwards, in the direction of the saphena major vein; but this very rarely happens.

Dissection of the Hernia.—On dissecting a femoral hernia, the following appearances present themselves. On cutting through the integument, the fascia superficialis is exposed; this, in its natural state, is thin and delicate; but frequently, when hernia exists, the fascia become dense and tough from pressure. Under this fascia a portion of the sheath of the femoral vessels is found, which closely envelopes the hernial sac itself; it is that portion which is perforated for the entrance of absorbent vessels.

Fascia propria.—This covering I first became acquainted with in examining a patient in St. Thomas's Hospital, in the year 1800, and have since invariably found it, when operating for this form of hernia. It may be termed the fascia propria of the hernia.

Beneath this covering, and between it and the sac itself, there is generally some adipose matter situated, on separating which the sac is laid bare. This layer of adipose matter I have known to be mistaken for omentum.

Mistaken for other Diseases.—The femoral hernia is much less likely to be confounded with other diseases than the inguinal, on account of the much more frequent formation of various tumours in the situation of the latter; but still there are some diseases which I have

known to be mistaken for femoral hernia, and in the discrimination of which much care is requisite.

Enlarged Gland.—In several instances, an enlarged gland in the groin has been mistaken for a femoral hernia; and, on the contrary, the hernia has been treated as an enlarged and suppurating gland; but such mistakes must arise from inattention to the previous history of the case.

Cases.—Some years ago, a man was admitted into Guy's Hospital with a strangulated hernia, over which a poultice had been applied for three days before his admission, under the supposition that it was a bubo. The operation was performed, and the intestine found gangrenous.

Mr. Bethune, surgeon, at Westerham, in Kent, assured me, that he saw a patient who had been the subject of a strangulated femoral hernia, which had been poulticed for some days, at length opened, when air and feculent matter escaped, and the patient died ten days after.

Hernia and enlarged Gland.—When a femoral hernia and enlarged gland exist at the same time, an attentive and minute examination is sometimes requisite to ascertain the existence of the former.

Case.—I once saw a lady with Mr. Owen, surgeon to the Universal Dispensary, who had suffered from the symptoms of strangulated hernia for nine days, and had been treated for inflammation of the intestines, as she had not mentioned the existence of a swelling in her groin. Mr. Owen discovered this swelling, and in consequence requested me to visit the patient, at the same time informing me, that the tumour had not the feel of a hernia, but that he supposed it must be one from the symptoms. Upon examining the part, I found an enlarged gland, about the size of a walnut, very hard and moveable; but beneath this gland, and separate from it, was an elastic tumour, which I succeeded in reducing by the employment of the taxis; and this relieved the patient from all the symptoms of strangulation.

Psoas Abscess.—Some of the symptoms attending psoas abscess resemble those of the femoral hernia, and might lead to mistake. Psoas abscess makes its appearance in the groin in the same situation as a femoral hernia; it dilates when the patient coughs, and is less apparent when the person is in a recumbent posture, than when he is erect. It may, however, be readily distinguished from hernia by the pain in the loins, which precedes the appearances of the swelling, by the general constitutional derangement attending it, by its more rapid increase, and by the absence of intestinal derangement.

Inguinal Hernia.—The error of most consequence respecting femoral hernia, is, that of mistaking it for inguinal hernia. Danger arises under such circumstances, from the operation of the taxis, the direction to make pressure in the femoral being quite different from that proper in the inguinal; but the most serious mischief is likely to arise, if an operation be necessary, in the division of the stricture.

Case.—I was once sent for to operate on a patient for a strangulated

inguinal hernia, which, on examination, I found to be femoral, and succeeded in reducing it, by making the pressure in the proper direction ; and I have known operations performed as for inguinal hernia, when the disease has been femoral. These mistakes arise from the femoral protrusion turning up over the crural arch or Poupart's ligament ; and much attention is often requisite in making an examination, before the surgeon can confidently decide on the true nature of the disease. The best marks of distinction which I have observed, are, that the neck of the femoral hernia is below and to the outer side of the spine of the pubes, while that of the inguinal hernia is above the spine ; also, by drawing down a femoral hernia, Poupart's ligament may be traced above it, which it cannot be, if the disease be inguinal.

Varicose Vein.—I have seen a case of enlargement of the femoral vein, which had somewhat the appearance of a femoral hernia, but it was readily detected, by pressing on the iliac vein above, while the patient was recumbent, when the tumour immediately appeared.

This Hernia most frequent on the Right Side.—Femoral hernia is most frequent on the right side, probably on account of most persons employing that side in the greatest degree.

Mothers liable to it.—Women who have borne many children are more liable to this disease than others, which arises from the extension of the abdominal parietes during gestation, causing a more relaxed state of the parts ; also, old persons are more frequently troubled with this disease than the young.

Most frequently Intestinal.—Most frequently the protruded part in femoral hernia is small intestine, very rarely only omentum, but occasionally both intestine and omentum. I have seen the cæcum in a femoral hernia on the right side, and the ovaria have also been found in the hernial sac.

Causes.—The femoral hernia is produced by the same causes as occasion the formation of inguinal hernia, except that I do not recollect a single instance in which this disease has been originated by a blow.

TREATMENT OF THE REDUCIBLE FEMORAL HERNIA.

Danger of Strangulation.—From the small size of the opening through which femoral hernia passes, the patient is in great danger from strangulation, unless proper means be adopted to prevent the descent of the viscera.

Truss.—The employment of a truss is the only method by which the safety of a patient can be secured ; but the truss required for femoral hernia must be of somewhat different construction to that which is required in inguinal hernia.

The pad, instead of being continued nearly in a straight direction with respect to the spring, as when required for inguinal hernia, should project downwards, nearly at right angles, to the spring, that it may

effectually press upon the opening through which the hernia protrudes under Poupart's ligament, and also upon the upper part of the thigh.

To be constantly worn.—The truss should be constantly worn, as for inguinal hernia, to prevent the protrusion of the hernia, and also with the view of obliterating the mouth of the sac, and curing the disease.

Does not Cure.—It is very rare, however, that a cure is effected in femoral hernia by means of the truss, but still it is right that it should be constantly kept on. I have known many instances in which the constant application of the truss has not produced the smallest apparent alteration in this hernia; the reason is, because Poupart's ligament, and the fascia lata, support the pressure of the truss, and the constant variation in the tension of these parts on every movement of the body, prevents the steady pressure necessary to produce a gradual closure of the opening.

In some cases, when the opening of the femoral sheath is large, it will be necessary to have a larger pad, and a stronger spring to the truss, and the pad may be more effectually kept in place, by means of a strap passed from it round the upper part of the thigh.

Double Truss.—If a hernia exist on both sides, a double truss will be required, made upon the same principles as the single one.

Salmon and Ody's Truss.—The truss made by Salmon and Ody's, I have generally found best adapted to these cases.

OF THE IRREDUCIBLE FEMORAL HERNIA.

Causes.—Femoral hernia may become irreducible from adhesions of the protruded parts to the interior of the hernial sac; from a growth of the protruded parts within the sac, so that they cannot repass the opening into the abdomen, or by a contraction at the neck of the sac itself, producing the same consequences.

Treatment.—In either case, a truss should be applied with a hollow pad, which is to receive the tumour, and prevent its increase.

Case.—A gentleman consulted me, in consequence of his having an irreducible femoral hernia, which, upon examination, I thought only to contain omentum; I directed him to wear a truss, with a depression in the pad, just large enough to receive the tumour. Two or three years afterwards, I saw this gentleman again, when I was gratified in learning, that his hernia had nearly disappeared. This was in consequence of absorption of the omentum having been produced by the pressure of the pad.

Truss cannot always be worn.—If the hernia be entirely intestinal, this form of truss, with a hollow pad, cannot always be worn, as I have known it to create very severe suffering.

OF STRANGULATED FEMORAL HERNIA.

Symptoms.—The symptoms of strangulation being the same as those I have already detailed in the lecture on inguinal hernia, I shall not again repeat them, but merely observe, that in femoral hernia, they are usually more urgent on account of the smallness of the opening, through which the protrusion occurs, causing greater pressure.

Severe.—The patients generally complain of more pain from strangulated femoral than inguinal hernia in the same state, and they die sooner from the former than the latter disease.

Medical Treatment.—The medical treatment required for strangulated femoral hernia, does not differ materially from that necessary for the inguinal disease.

Taxis.—In the first place, the taxis should be employed, but in a different mode to that I have described as proper for the reduction of inguinal hernia. The patient should be placed on a bed, with the shoulders elevated, and the thighs bent at right angles with the body, leaving only sufficient space between them to admit the arm of the operator. The tumour is first to be pressed downwards, until it be below the level of Poupart's ligament, when it is to be kneaded upwards towards the abdomen.

Difficulty.—The difficulty usually experienced in attempting to reduce this form of hernia, arises from the pressure being made at first in an improper direction, viz., upwards, so that the hernia is forced over Poupart's ligament, instead of beneath it, and in this way the hernia never can be reduced.

Pressure gentle.—As in the reduction of inguinal hernia, the pressure should be gentle and continued, avoiding violence, which may be productive of the most serious consequences.

General Treatment.—Should the taxis fail, the same general treatment as that directed for inguinal hernia, should be pursued, as bleeding, the warm bath, opium, the application of cold, and the injection of the tobacco glyster. These remedies, however, have much less beneficial influence in femoral, than in the other forms of hernia; which I imagine is owing to the nature of the parts through which the protrusion occurs, and the smallness of the aperture through which it descends.

Symptoms urgent.—As the symptoms are usually very urgent in femoral hernia, and as the disease more rapidly destroys life, there is the greater necessity for the early performance of an operation, when the usual means to effect reduction have been tried and have failed. I have known a patient die in seventeen hours after the symptoms of strangulation had commenced; and on the contrary, I have performed an operation with success, after the symptoms had existed seven days; but in general, the patients labouring under this disease do not survive the strangulation more than four days, if the stricture remain; whereas, in inguinal hernia, under similar circumstances, they often live a week or more.

OF THE OPERATION FOR FEMORAL HERNIA.

Preparation.—The hair is to be removed from the surface of the tumour, and the bladder should be emptied. The patient should then be placed upon a table of convenient height, in a horizontal position, but his shoulders should be a little raised, and the thigh bent towards the abdomen, in order to relax the abdominal muscles, &c.

Operation.—The first incision should commence a little above the superior part of the tumour, towards the umbilicus, and be extended downwards, somewhat to the inner side of the prominent part of the swelling, as far as its middle; a second incision should then be made from the inner to the outer side of the tumour, at right angles with the first incision, and joining it at the lower part, so that the two together form a figure resembling an inverted **J**.

The angular flaps should then be dissected up, to allow of sufficient space for the other steps of the operation.

Superficial Fascia.—The superficial fascia which is thus exposed, should next be divided to the same extent as the integument, by which the covering formed of the sheath of the femoral vessels will come into view,* this should be carefully cut into, so as to admit of the introduction of a director under it, upon which it should be further opened, so as to freely expose the hernial sac.

Layer of Fat.—If the patient is fat, a layer of adipose matter may be found between this covering, formed of the sheath of the femoral vessels, and the sac itself.

Sheath of the Vessels.—I have known this covering, which I call the fascia propria, to be mistaken for the hernial sac, so that the surgeon who operated, supposed he had opened the peritoneal covering when he cut into the sheath, and after considerable difficulty, he succeeded in pushing up the protruded parts, but on the following day, the patient died; and when examining his body, it was discovered, that the hernial sac had not been opened, but had been thrust up into the abdomen with its contents, which still remained in a strangulated state.

Hernial Sac.—The surgeon having exposed the hernial sac, should pinch up a small portion of its anterior and lower part, between his finger and thumb, carefully excluding any portion of the contents of the sac, and then placing the blade of his knife horizontally, he should cautiously make a small cut into the elevated part, making an aperture of sufficient size to allow of the passage of a director, upon which he should further divide the anterior part of the sac upwards and downwards.

Fluid.—A quantity of fluid usually escapes, when the sac is first opened, which varies greatly in quantity, and somewhat in colour, according to the period that the strangulation has existed. It is not

* There is usually a considerable vein between the superficial fascia, and the fascia propria, as well as absorbent glands.

uncommon, however, for the fluid to be entirely wanting, even when there are no adhesions.

If inflammation runs high, the peritoneal surface of the intestine is covered by adhesive matter.

Division of the Stricture.—The next and most important step in the operation, consists in dividing the stricture, the situation of which should first be distinctly ascertained by passing the point of the little finger into the hernial sac, on the fore and inner part of its contents.

Seat of.—If the hernia be large, the seat of stricture may be at or under the opening in the fascia lata, through which the covering formed by the sheath of the femoral vessels is protruded; but, generally, the stricture will be found immediately beneath Poupart's ligament, in the mouth of the sac itself, where the hernia quits the abdomen.

In either case, a director should be very carefully introduced into the sac, anterior to its contents, and gradually insinuated under the stricture, and upon its grove the hernia knife (before described) should be passed, with its cutting edge turned upwards, and a little inwards, towards the umbilicus, in which direction the stricture should be divided.

Two Strictures.—In some cases when the hernia is large, strictures may be found both at the crescentic margin of the fascia lata, and under the crural arch of Poupart's ligament, and each will require division, that at the fascia lata must of course be first liberated.

How treated.—When a stricture, therefore, exists at the crescentic margin, the surgeon, after dividing it, should make a careful examination, to ascertain if the passage to the abdomen be free, before he attempts to return the protruded parts, for should a second stricture exist, he may rupture the protruded intestine in the violence he must employ in endeavouring to return it.

Direction of Division.—In dividing the inner stricture, it has been recommended to cut in the direction of Gimbernat's ligament, inwards towards the pubes; but as the stricture is not occasioned by this ligament, there cannot be any necessity for dividing it; I have known Gimbernat's ligament divided, from an idea that it formed the stricture, but the stricture still remained at the orifice of the fascia propria, or in the mouth of the sac itself, and the patient died.*

Great Caution necessary.—Great caution is requisite in dividing the stricture, if the protrusion be entirely intestinal, and the operator should not introduce the knife, until the intestine has been carefully placed out of danger by an assistant.

Case.—Sometime ago, a case occurred in one of the Borough hospitals, in which the intestine was wounded, when the operator was

* It is curious, that Gimbernat's ligament should ever have been supposed to be the seat of stricture, as it exists only upon the inner side of the mouth of the hernial sac, and therefore could not influence the outer portion. If strangulated femoral hernia be examined in the dead body, and Gimbernat's ligament be cut through, the hernia is not liberated by such a division, for the orifice of the fascia propria, or the neck of the sac itself, still girt the viscera as much as ever.

dividing the stricture, which he did inwards, towards Gimbernat's ligament; feculent matter was extravasated into the cavity of the abdomen, and the patient died. On examining the parts after death, two openings were found in the intestine, close to the mouth of the sac.*

Adhesions.—The treatment I have directed as proper in inguinal hernia, when the protruded parts adhere to the sac, or when the intestine or omentum are gangrenous, is also proper under similar circumstances in femoral hernia.

After-treatment.—After the operation, the same mode of closing the wound, and indeed the after-treatment generally, should be the same as in the inguinal disease.

But little variety.—Very little variety is met with in femoral hernia, the most important one is that in which the obturator artery arises from the epigastric, and surrounds the neck of the sac.

Dr. Barclay's Preparation.—Dr. Barclay, a celebrated teacher of anatomy at Edinburgh, was kind enough to send me a specimen of this variety, which was taken from a patient whose previous history could not be ascertained.

Mr. Wardrop has also met with this variety.

Common Course of the Obturator.—Although the obturator artery frequently arises from the epigastric, it is very rarely found passing before the sac in femoral hernia, but usually takes a course to the outer side, and beneath the sac, as I have often witnessed when dissecting the parts of femoral herniæ. My mode of avoiding injury to the epigastric or obturator arteries, is to make a very slight division of the stricture with the knife; and then, by pressure of the finger or of a director, to enlarge the opening.

Fluid beneath the Fascia Propria.—In one instance I have met with a large quantity of fluid situated between the fascia propria and the hernial sac. The following is a short account of the case:—

Case.—Miss —, æt. 20, had been the subject of a femoral hernia on the right side for three or four years, which had acquired about the size of a pullet's egg. In June, 1825, the hernia became strangulated, and increased to a very large size. As she did not mention the existence of the hernia to her medical attendants, it was not discovered until the third day from the commencement of the symptoms, the continuance and severity of which led to an examination. Mr. Wakefield, of Hatton Garden, who had attended her, immediately requested me to visit her; when, after trying, without effect, the ordinary means to reduce the hernia, I operated. On opening the fascia propria, I was astonished at the escape of nearly a pint of transparent fluid, resembling that usually drawn off in hydrocele. The hernial sac, which then became exposed, was small; and, on opening it, a little of the usual dark-coloured fluid was discharged. A small portion of omen-

* Cutting directly inwards is a most dangerous operation in femoral hernia, as the intestine is very likely to be wounded.

tum, with a fold of small intestine, were protruded. After dividing the stricture, and returning the viscera into the cavity of the abdomen, I removed a large part of loose bag exterior to the sac. The patient recovered rapidly.

LECTURE XXXV.

ON UMBILICAL HERNIA.

Synonyme.—THIS form of hernia, which is also termed exomphalos, is next in frequency to the inguinal.

Natural Opening.—The protrusion takes place through the opening in the linea alba, which is formed in the foetal state for the passage of the vessels of the umbilical cord.

How closed usually.—After the funis has been tied, this opening usually becomes closed by dense cellular tissue, and the remains of the umbilical veins and arteries, but not by a tendinous structure. The integument over it is adherent, and generally drawn in, forming the navel.

Dissection of the Parts.—Behind the navel, when these parts are dissected, the peritoneum is found, which adheres more firmly at this part than any other of the linea alba ; it is connected above to the remains of the umbilical vein, and below to the ligament of the bladder and remains of the umbilical arteries. There is not any perforation in the peritoneum behind the navel, as the vessels do not penetrate it, but pass between it and the abdominal parietes.

Commencement of the Disease.—Umbilical hernia commences in a small protrusion about the size of a nut, which can be easily reduced, but which again appears immediately the patient coughs or exerts himself. If neglected, it soon increases in bulk ; and, as it augments, it gravitates : so that the larger part of the swelling is below the orifice of the sac, and in some instances it acquires so great a size as to reach to the upper part of the thighs.

Creates much Suffering.—This disease, if intestinal, and not supported, is attended with much danger, and creates a considerable degree of suffering. The patient frequently feels so much weakness and sensation of sinking, as to be incapable of making an exertion. The bowels are very irregular in their actions, and the patient is much troubled with flatulence and nausea.

Symptoms when Intestinal.—Besides the frequent occurrence of these symptoms, the intestinal protrusion may be distinguished by its

elasticity, its uniform feel, and by the passage of the air, &c., through the canal, producing a gurgling noise.

When Omental.—When the protrusion is entirely omental, the patient experiences but little uneasiness or irregularity of the bowels. The feel of the swelling is uneven and doughy, and is but little tender under considerable pressure.

When both.—Sometimes, if both intestine and omentum are contained in the hernial sac, they can be distinguished from each other by the above-mentioned marks. The omentum is in these cases usually above, and the intestine below. But, most frequently, the quantity of omentum protruded is much larger than that of the intestine, and the latter is covered by the former, so that it cannot be at first distinguished.

Common in Infants.—The umbilical hernia is very common in infants soon after birth. Intestine is then generally protruded, and the shape of the swelling somewhat resembles the distended finger of a glove in shape; the hernia is easily reduced, unless the opening in the linea alba is very small.

Children, subject to this disease, suffer from griping and a very irregular state of bowels, sometimes being constipated, at others being violently purged.

Appearance in the Adult.—When this hernia occurs in the adult, if the patient be thin, the shape of the tumour is pyriform and defined; but in fat persons, the hernia is sometimes scarcely perceptible on a superficial inspection, as it extends upwards and downwards, is flattened anteriorly, and has its circumference blended with the adipose matter, so as not to present any defined edge. The tumour may be flattened in thin persons, but when so, its extent is always evident.

Sac in part Deficient.—Although, generally, the hernia has a peritoneal covering, or proper sac, yet, in a few instances, when the disease has been of long standing, and has acquired a very large size, I have seen the sac in part wanting.

Two Sacs.—I have also known two sacs to exist at the same time; one protruded by the side of the other, and only separated at their origin by a thin septum.

Case.—Mr. Cline operated twice upon a woman in St. Thomas's Hospital, for strangulated umbilical hernia, in whom two herniæ existed, having their commencement about half an inch apart, but the sacs lying in contact.

Most frequent in Women.—Women are much more liable to this disease than men, and the most frequent cause of it is pregnancy, the bowels being pushed up by the gravid uterus as it rises from the pelvis.

Causes.—Another cause is the deposition of adipose matter within the omentum and mesentery, whereby their size is so much increased that the abdomen is hardly capable of containing them. Women who become corpulent after having had many children, are often subject to this disease, on account of the lax state of the abdominal parietes, not affording sufficient resistance to prevent such protrusions.

The distension of the abdominal parietes, and protrusion of the navel, which is sometimes met with in ascites, is said to be a cause of umbilical hernia; but I am inclined to think that it is more frequently the consequence than the cause of this disease.

TREATMENT OF REDUCIBLE UMBILICAL HERNIA.

In Infants.—In infants subject to this disease, the plan I usually adopt, is, after having reduced the hernia, to apply half of an ivory ball sufficient to cover the opening, and to confine it in that situation by means of adhesive plaster. A linen belt should be applied, and secured round the body, but as soon as the child begins to walk, two straps must be fixed to the lower part of the belt, which should pass under the pelvis, between the thighs, to prevent the belt from slipping.

In Adults.—For the adult, or even for children, when the hernia is of small size, a spring truss may be employed, made on the same principle as that directed for inguinal or femoral protrusions. The pad of the truss should cover the opening through which the viscera escape; and the spring should pass from the pad to the back of the patient, a little beyond the spine; and a strap should be continued from the spring to the pad, to complete the circle.

In very Fat Persons.—When the patient is very corpulent, so that the navel is deep, the portion of ivory may be advantageously placed under the pad of the truss, the more effectually to close the opening of the sac; and this is much better than having a conical pad, which is liable to shift its position when the patient is in motion; but the half globe of ivory does not follow the motions of the pad.*

When very Large.—Very large herniæ, accompanied with a lax state of the abdominal parietes, require a different form of truss, as it is necessary to make a more extended pressure. The pad of the truss, therefore, instead of being only of sufficient size to cover little more than the orifice of the sac, must be of considerable extent, so as to press upon a large space round the hernial opening, and thus support the parietes as well as the hernia, which will render the patient comfortable, although there is not any prospect of thus effecting a cure.

OF THE IRREDUCIBLE UMBILICAL HERNIA.

Causes.—Umbilical hernia becomes irreducible from the same causes as the inguinal does; viz., adhesions of the intestines or omentum to the inner surface of the sac, or a growth of omentum, rendering it too bulky to repass the opening by which it escaped.

Becomes very Large.—Under these circumstances, the hernia some-

* The ivory ball with the adhesive plaster, will, in the adult, prevent the increase of a small hernia, so as to render a truss unnecessary.

times acquires an enormous size, more particularly in women, whose abdominal parietes have been weakened by frequent pregnancy ; and I have in such persons seen the pudendum entirely covered by the hernial swelling. The umbilicus in these cases is brought nearer to the pubes than natural, by the constant weight and drag of the hernia.

Danger of.—With such large hernia the patient is exposed to constant danger from blows or falls ; besides the weight of the tumour, and an ulcerated state of integument, which often occurs, renders the patient incapable of following any employment requiring bodily exertion.

Treatment.—When the hernia is irreducible, and not of very large size, a truss should be worn with a hollow pad, as recommended for irreducible inguinal herniæ. The hollow should be just sufficient to contain the swelling, and the edges should be rounded off so as to prevent any injury from pressure to the surrounding parts. The substance of the cup should be pewter, which should be covered with soft leather. The spring should be of the same kind as that of the common truss.

When very Large.—In very large herniæ of this description, a truss cannot be worn ; and all that can be done to relieve the patient is to support the swelling by bandages, passed over the shoulders so as to prevent the constant dragging of the tumour.

OF STRANGULATED UMBILICAL HERNIÆ.

Symptoms.—The symptoms indicating strangulation in this form of hernia, are the same as those I have described as existing when inguinal or femoral herniæ are in the same state ; but in the umbilical disease they are generally less urgent.

Causes.—Strangulation is frequently produced in these cases by the patient taking food not easy of digestion, or such as occasions flatulency ; persons having this complaint should therefore eat sparingly, and be careful to avoid all food difficult of digestion, or likely to create flatulence.

Seat of Stricture.—The seat of stricture is usually at the tendinous opening through which the hernia protrudes, but sometimes the neck of the sac itself is thickened, and prevents the reduction of the viscera.

Treatment.—Taxis.—When strangulation exists, the surgeon should first endeavour to relieve the patient by employing the taxis in the following manner. The patient being placed on the back, the shoulders should be elevated by pillows, also the pelvis a little raised, and the thighs bent at right angles with the body. The surgeon should then grasp the swelling with his hand, and direct the pressure a little upwards as well as inwards, because the opening to the abdomen is not usually in the centre of the swelling, unless the hernia is small, or projecting, when the pressure should be made directly inwards. If the neck of the sac can be distinctly felt, the surgeon should knead it with the finger and thumb of one hand, while he presses the hernia with the other.

In very Large Herniæ.—In very large, flat, and spreading hernia, when the tumour cannot be grasped by the hands, the surgeon should make pressure by means of some broad surface, as the bottom of a wooden platter, which he should place on the surface of the swelling, and keep up a steady pressure upon it for twenty minutes or half an hour.

General Treatment.—Should the employment of the taxis fail in relieving the patient, the other means recommended for the femoral inguinal herniæ, under similar circumstances, should be tried ; but the remedy which I have found most successful in this disease, and on which I place the greatest reliance, is the tobacco glyster, as it appears to produce much more beneficial effects in this form of hernia, than in the others I have described. It should be used of the same strength, and with the same precautions I have before mentioned. In many instances I have known this remedy successful, after repeated trials of other means had failed to relieve the patient.

Bleeding, and the application of cold, I have known to produce the desired effect after the taxis had failed ; but the surgeon must be careful how he takes away blood, as women of delicate constitution, and lax fibre, are often the subjects of this disease, in whom the loss of blood, in large quantity, might prove destructive.

Should the strangulation continue in spite of these trials to relieve it, the surgeon should proceed to liberate the hernia by an operation, the performance of which is extremely simple, but requires a little caution.

Operation.—The patient being placed upon a table of convenient height, in an easy position, with the abdominal muscles relaxed, the surgeon should commence the operation by making an incision across the swelling, and then a second cut at right angles with the first, in the direction of the linea alba ; the transverse incision should be below, and should be joined at its centre by the lower part of the perpendicular cut, so that the two represent an inverted J.

The two angles should be dissected up to expose the superficial fascia, which the surgeon must next divide, but very carefully, as the hernial sac itself is sometimes wanting in part ; and in such a case the protruded viscera would be immediately exposed. This covering should therefore be opened, as if it were the sac, by nipping up a small portion between the finger and thumb, in the manner I have already described.

Hernial Sac.—If the peritoneal covering be complete beneath the superficial fascia, it should be cut into, and divided further, upon a director, in the same way as when operating for other herniæ. The escape of a small quantity of fluid usually indicates that the sac has been opened.

Division of the Stricture.—The protruded viscera being exposed, the operator should carefully pass his finger over their upper part to the opening of the umbilicus, and then introducing the hernia knife upon his finger, and insinuating it under the stricture, he should cut

upwards towards the ensiform cartilage to such an extent as will make the opening sufficiently large to allow of an easy reduction of the protruded parts.

Return of Viscera.—Having divided the stricture, the intestine, if in a fit state, should be first cautiously returned ; and the omentum, if in large quantity, or if in a doubtful state, may be cut away, but if in a small quantity, and sound, it may be returned into the abdomen.

After-treatment.—The edges of the external wound should be brought together by sutures, and the approximation completed by strips of adhesive plaster ; a compress of linen should be placed over this, and confined by means of a broad bandage passed round the body.

It is of much importance, after this operation, to procure a closure of the wound by adhesion, as the direct communication with the abdomen increases the risk of peritoneal inflammation.

Operation for Large Herniæ.—For very large umbilical herniæ, when strangulated, I should recommend a different mode of operating, which should be performed in the following manner. A small opening should be made over the neck of the swelling, through the integument and superficial fascia, so as to expose the hernial sac at that part; then the operator should pass his finger between the sac and edge of the umbilical opening, so as to guide the hernial knife, by which the umbilical opening should be dilated upwards without dividing the sac.

Case.—I performed this operation upon a Mrs. Aaron, who had long been afflicted with a large irreducible umbilical hernia, which became strangulated. When I had divided the tendon, I was able, by very slight pressure, to return a portion of the protruded intestine, and she rapidly recovered.

Adhesions.—In some cases the intestine adheres so firmly to the mouth of the sac, that great care is requisite to avoid wounding it. The separation of these adhesions in part must be effected with as little violence as possible, by means of the finger, to allow of the safe division of the stricture.

Strangulation from Opening in the Sac.—In some instances, where there has been an opening formed by absorption, or laceration of the hernial sac, the intestine, or omentum escape from the sac through the aperture, and become strangulated by the pressure from its edge. In these cases there is considerable danger, unless the operation be very carefully performed, as the viscera are exposed immediately the superficial fascia is divided.

Should the adhesions be extensive and firm, the surgeon must be content with liberating the stricture, and not attempt to return the protruded viscera.

Part of the Colon protruded.—The intestine generally protruded in umbilical hernia, is a portion of the colon ; the appendices epiploicæ of which become more quickly altered than the intestine itself ; and if much changed, they should be cut off rather than any risk incurred by leaving them to slough after the operation.

Danger of the Operation.—The danger in this operation is of

wounding the intestine, as there is not any vessel of importance that can be injured.

OF VENTRAL HERNIA.

Like the Umbilical.—This hernia only differs from the umbilical in its seat, which is usually at the linea alba, or linea semilunaris; but any visceral protrusion at the anterior, or lateral parts of the abdomen, except those already described, may be called ventral herniæ.

Symptoms.—The symptoms of this form of hernia are usually the same as those of the umbilical, excepting when the hernia is formed between the umbilicus and ensiform cartilage in the linea alba, and contains a portion of the stomach, when peculiar symptoms will arise.

Case.—I once saw a gentleman with a hernia in this situation, who suffered constantly from indigestion, flatulency, and a distressing sensation of sinking at the scrobiculus cordis. His hernia was, however, reducible, and the application of a truss relieved all his unpleasant symptoms.

Causes.—The following causes may give rise to this hernia :—

1. A natural deficiency of tendinous structure, which I have known to a very considerable extent, in the linea alba or linea semilunaris.
2. The apertures for the passage of blood-vessels being unusually large.
3. Injuries by which the continuity of the parietes is destroyed.

Coverings.—The coverings of ventral hernia are generally the same as those of the umbilical disease; viz., the integument, superficial fascia, and peritoneal sac; but in some instances I have found another covering connected with the edge of the opening in the tendon through which the hernia escapes.

When this hernia occurs in consequence of wound, the coverings must, of course, vary.

OF THE REDUCIBLE VENTRAL HERNIA.

Truss.—When seated in the linea alba, a truss, similar to that employed for umbilical hernia, should be worn; but, when low down in the linea semilunaris, the truss applied should resemble that recommended for inguinal hernia, only that the pad must be turned somewhat upwards.

When irreducible, the same form of truss, with a hollow pad, will be required.

OF STRANGULATED VENTRAL HERNIA.

Symptoms.—The symptoms indicating strangulation of this hernia are, in every respect, similar to those already described, as occurring

when umbilical hernia is in the same state ; and the means which should be tried, with a view of relieving the patient, should be of a like nature.

Treatment.—As in the umbilical disease, the tobacco enema has here a more powerful effect than in the inguinal or femoral herniæ.

Taxis.—In employing the taxis, the pressure should be made a little upwards as well as inwards, for the swelling, like the umbilical, has the greater part situated below the opening from the abdomen.

Operation.—If an operation becomes necessary for the relief of the patient, it should be performed in the same mode as that described for umbilical hernia ; but when the disease is seated low down in the linea semilunaris, the surgeon must bear in mind the course of the epigastric artery, and divide the stricture so as to avoid it.

For large Herniæ.—In very large ventral herniæ, the operation I have mentioned before, of merely exposing the neck of the sac, and dividing the stricture, without opening the sac itself, may be adopted with advantage.

After-treatment.—In the after-treatment of these cases, nothing of importance is necessary beyond what I have already recommended for the other forms of herniæ.

OF THE THYROIDAL HERNIA, OR HERNIA FORAMINIS OVALIS.

The first example of this disease which I saw, was accidentally discovered in a male subject, in whom an inguinal hernia also existed on the same side. The parts are preserved in the Collection at St. Thomas's Hospital.

Course.—The hernia was protruded through the opening in the ligament of the foramen ovale, by which the obturator artery and nerve pass to the thigh ; the pubes was immediately before the neck of the sac, and the ligament of the foramen embraced the other portion about three-fourths. The obturator vessels were situated behind, and somewhat to the inner side of the neck of the sac. The sac itself, not larger than a nutmeg, was placed under the heads of the pectineus and adductor brevis muscles.

Two Herniæ in the same Person.—I lately had an opportunity of seeing two specimens of this hernia in the same subject, one existing on each side, which were not discovered during life.

Several cases of this form of hernia are related in the first volume of the Memoirs of the Royal Academy of Surgeons at Paris.

Operation difficult.—The depth at which this hernia is situated, would render an operation, in case of strangulation, extremely difficult ; but, should such a step be necessary, I should recommend the division of the stricture inwards on account of the obturator artery, &c.

Treatment.—If reducible, a truss, similar to that used for crural hernia, but with a thicker pad, would prevent its further descent.

OF THE PUDENDAL HERNIA.

Its Seat.—This hernia appears in the external labium pudendi, about its middle.

Course.—It commences at the side of the vagina, and passes into the labium between the vagina and ischium; it has usually a pyramidal figure, and presents the characters of other herniæ, as elasticity, dilatation on coughing; also appearing in the erect, and disappearing when the patient is recumbent.

The situation of swelling, and its want of connection with the abdominal ring, sufficiently distinguish it from inguinal hernia, which also appears in the labium, but at the upper part.

Treatment.—The increase of this disease may be prevented by the patient's constantly wearing a bandage to support the part; but a partial protrusion cannot readily be checked, as from its situation, a pessary, unless of very large size, would not be of any service.

When Strangulated.—When strangulated; the usual remedies before mentioned should be tried; and, if an operation becomes necessary, the sac should be carefully opened, and the stricture divided inwards towards the vagina, the bladder being previously emptied.

OF THE VAGINAL HERNIA.

Its Seat.—This hernia protrudes between the uterus and rectum, where the peritoneum is reflected from one viscus to the other, at the posterior part of the vagina; sometimes, however, it appears at one side instead of the posterior part. It is only covered by the lining membrane of the vagina.

Treatment.—The use of a pessary will prevent the protrusion of this disease.

OF THE PERINEAL HERNIA.

Its Seat.—In the male, this hernia protrudes between the bladder and rectum; and, in the female, between the rectum and vagina.

Case.—I have only seen one instance of this disease, which was in the body of a male brought into the dissecting room.

Dissection.—The reflected portion of peritoneum between the bladder and rectum, was protruded as far as the perineum, but no external tumour was perceptible; Mr. Cutcliffe, surgeon, at Barnstaple, has the parts preserved.

Anterior to the sac were seated part of the bladder, the prostate gland and terminations of the vesiculæ seminales; behind was the rectum, and the mouth of the sac was about two inches and a half from the anus.

The following curious case is taken from Mr. Bromfield's Chirurgical observations :—

Case.—‘ A lad, between six and seven years of age, was put under my care to be cut for the stone. The staff, in the attempt to introduce it into the bladder, met with resistance from a stone, which seemed to be lodged in the membranous part of the urethra, or a little lower down in the neck of the bladder. I made my incision, as usual, through the integument and muscles, to get at the groove of the staff; and then pressed the blade of my knife into the sulcus, at the extremity of the staff, being able to divide only the membranous part of the urethra; and a very small portion, if any, of the prostate gland; by the examination of the parts, with my fingers, I then found that this hard body was a process continued from the body of the stone contained in the bladder; I therefore took the double gorgeret, without the cutting blade affixed, intending only to push back the stone, and dilate the neck of the bladder, which I did by getting the beak of the gorgeret into the sulcus of the staff, and pressing it against the point of the stone, following its course with the instrument as the stone retired: but the direction that the gorgeret took alarmed me, as it passed under the ossa pubis with great obliquity. I then concluded that the instrument had taken a wrong route, as I could not, in this case, have the advantage of the groove of the staff further than the extremity of the membranous part of the urethra; but on withdrawing the upper part of the gorgeret, I introduced the fore-finger of my right hand into the bladder, by the under part of the instrument, which remained in the bladder, and was now no more than the common gorgeret; by which I was soon convinced that it was in the bladder, the situation of which was much higher in the pelvis than usual. I then introduced my forceps, and, while I was searching for the stone, a thin diaphanous vesicle, like a hydatid, appeared rather below my forceps, which, in the child's screaming, soon burst, discharging a clear water, as if forced from a syringe; the next scream brought down a large quantity of small intestines. I need not say, that this was sufficient to embarrass a much better operator than myself; however, I proceeded in the operation with the greatest tranquillity, being convinced, that this very extraordinary event was not owing to any error in the operation: but the difficulty was to keep the intestine out of the cheeks of the forceps, when I should again attempt to lay hold of the stone; the extraction of which would be very difficult to effect, from the unusual situation of the bladder in this subject. The lower part of the gorgeret remaining in the bladder, the forceps were again easily introduced, which being done with the fingers of my right hand, I pressed back the intestines, while I laid hold of the stone; but during the extraction the intestines were again pushed out by the child's screaming: nevertheless, as I had the stone secure in my forceps, I proceeded to extract it, which I did very easily. Before I introduced the common gorgeret for the introduction of the forceps the next time, I got up the intestines again, and desired my assistant to keep them up till I got hold of a second stone, which, from its shape, appeared to be that which had got

into the neck of the bladder. As soon as I was convinced by the examination, with my finger, that the bladder was freed totally from any pieces of stone, I again returned the intestines into the pelvis, and brought the child's thighs close together ; a piece of dry lint was applied on the wound, and a pledget of digestive over it ; he was then sent to bed, with no hope of his surviving till the next day ; but, contrary to expectation, the child had a very good night, and was perfectly well in little more than a fortnight, without one alarming symptom during the process of cure ; neither did the intestines once descend through the ruptured peritoneum after they had been returned when the operation was finished."

The following are Mr. Bromfield's ideas of the nature of this case :—

"After the incision of the integument and muscles was made, as usual, there soon appeared in the wound something like a hydatid, which proved afterwards to be that part of the peritoneum which is extended from the left side of the bladder and intestinum rectum to its attachment on the inside of the left os innominatum ; preventing the intestines from falling down too low into the pelvis ; therefore, in this case, this expansion of the peritoneum must have been forced out of its usual situation.

"Suffering daily more and more extension, it will at length permit the intestines to fall down to the very bottom of the pelvis, between the bladder and the rectum ; therefore, when in the case above related, the resistance of the integument and muscles was taken off by the operation, the peritoneum was forced out, and at first was filled only with lymph, which gave it the appearance of a hydatid ; but its thinness not being able to resist any longer the force of the abdominal muscles, pressing the viscera downwards, it burst, and the intestines soon followed through the aperture. If this is allowed, we can easily account for the oblique course that the gorgeret took when first introduced, as the intestines had raised up the fundus of the bladder against the back part of the ossa pubis, so that my forceps could not be conveyed into the bladder, but almost in a perpendicular direction ; and I was obliged to press with my hand on the lower part of the abdomen, just above the pubes, to bring the bladder and its contents sufficiently low for the laying hold of the last stone with my forceps."

Scarpa met with a case in which this hernia formed a tumour in the perineum.

This form of hernia, and the vaginal, may become dangerous during gestation, and some cases illustrating this are related in Dr. Smellie's Cases on Midwifery.

OF THE ISCHIATIC HERNIA.

Very rare.—This is an extremely rare form of hernia ; indeed, I have only seen one specimen of it, for which I am indebted to my

friend Dr. Jones, whose name is well known, by his excellent work on Hæmorrhage.

Case.—Dr. Jones having told me that he had inspected the body of a patient who had died in consequence of the strangulation of a portion of intestine in the ischiatic notch, I became very anxious to obtain the parts; and, after considerable difficulty, we obtained permission to open the body a second time, when I removed the hernia and surrounding parts.

Dr. Jones had been requested to visit the patient, a young man, about twenty-seven years of age, in consequence of his suffering from symptoms which resembled those produced by strangulated hernia. The patient stated that he had experienced a similar attack before, which had been relieved by opium, followed by a dose of castor oil. Dr. Jones, therefore, gave him some opium, and directed that he should take some pills composed of calomel and scammony, as soon as the stomach appeared tranquil.

On the day following, Dr. Jones found that the patient had experienced relief for a short period after taking the opium, but that the pills had been thrown up, and no evacuation had taken place from the bowels. The patient was also much troubled by eructations and flatulence, for which he took some spir: ammoniæ comp: and spirit: lavendulæ, with good effect.

Dr. Jones, feeling confident that the symptoms were produced in consequence of the strangulation of some portion of the intestines, now examined the man carefully; but could not detect any protrusion; nor did the patient complain of any local pain, which could induce Dr. Jones to inspect the ischiatic notch.

As no stools had been procured, some purgative glysters were thrown up, but without producing the desired effect. Other purgatives were subsequently given, and glysters were again thrown up, but without affording relief; also leeches and blisters were employed, but they produced only temporary benefit. On the sixth day from the commencement of these symptoms, they suddenly subsided, excepting that no evacuation from the bowels took place; and the patient felt himself so well, that he was desirous of going to business; but Dr. Jones advised him to remain quiet for some days. Early on the morning of the seventh day the patient got up, and went down from his bed-room, which was in the fourth story, to the ground floor, but he soon returned, complaining of being very unwell; after which he gradually sunk, and expired on the same evening.

Dissection.—On examining the body after death, a portion of the ilium was discovered passing by the right side of the rectum to the ischiatic notch, through which a fold of the intestine was protruded into a small hernial sac, to the inner surface of which the intestine was adherent. The strangulated part of the gut, and about three inches of it on each side of the stricture, was very much discoloured. The intestines between the stomach and protruded portion were distended with air, and had a few livid spots upon them. The intestines from

the stricture to the rectum were very much contracted, particularly the arch of the colon.

On carefully dissecting the parts after I had removed them from the body, I found a small orifice in the pelvis, anterior to, but a little above the sciatic nerve, and on the fore part of the pyriformis muscle. This opening led to the hernial sac, which was situated under the gluteus maximus muscle, and in which the intestine had been strangulated.

The orifice of this hernial sac was placed anterior to the internal iliac artery and vein, below the obturator artery, and above the obturator vein; its neck was seated before the sciatic nerve, and its fundus was covered by the gluteus maximus muscle. Below the fundus was the sciatic nerve, and behind it the gluteal artery; above, it was placed near the bone.

Treatment.—Should the existence of such a hernia be ascertained, it might, if reducible, be prevented from protruding by the application of a spring truss; but, should it become strangulated, and an operation be deemed advisable, I should recommend the division of the stricture to be made directly forwards.

OF THE PHRENIC HERNIA.

Its Seat.—Protrusions of the abdominal viscera through the diaphragm, may take place either at the natural apertures framed for the passage of the œsophagus, vena cava, aorta, &c., or through unnatural openings, the consequence of malformation or injury.

Symptoms.—When this hernia exists, the patient suffers much from interrupted respiration and cough, besides experiencing the symptoms of hernia already enumerated.

Hernial Sac.—This hernia has, or has not a proper sac, according to the circumstances of its formation; when protruded through one of the natural apertures, it has a proper sac; when occurring from malformation it sometimes has a peritoneal covering, and sometimes this covering is wanting; when the consequence of laceration or injury, the hernial sac is always deficient.

Case.—I have never seen a hernia protruding through any of the natural openings of the diaphragm; but several cases are related by Morgagni, in which this form of hernia existed. He mentions the case of a young man who was attacked with symptoms of acute cardialgia and constant vomiting, under which he expired. On examining his body after death, the omentum, with part of the colon, the duodenum, some portion of the jejunum and ilium were found in the cavity of the thorax, having passed through the same opening by which the œsophagus descends; the lungs and the heart were compressed into a very small space.

From Mal-formation.—The occurrence of phrenic hernia from mal-formation is not very uncommon. There are two preparations in

the Museum at St. Thomas's Hospital exhibiting this disease. In one instance the opening is of sufficient size to admit nearly the whole of the small intestines through it; in the other specimen the large portion of the stomach was protruded through a much smaller aperture. In both cases the unnatural openings are in the left muscular portion of the diaphragm.

Some cases of this form of the disease are also related in the first volume of *Medical Observations and Inquiries*, by Dr. G. Macauley.

Danger.—When the unnatural aperture is small, the patient suffers frequently from the usual symptoms of hernia, and is in danger of being destroyed by a strangulation of the protruded parts as in other hernia.

In the year 1798, I published the history of an interesting case of this description, which I shall take the liberty of relating here.

Case.—Sarah Homan, æt. twenty-eight, had, from her childhood, been afflicted with oppression in breathing. As she advanced in years, the least hurry in exercise, or exertion of strength, produced pain in her left side, a frequent cough, and very laborious respiration.

These symptoms were unaccompanied with any other marks of disease; and, as her appetite was good, she grew fat, and, to common observation, appeared healthy. The family with whom she lived suspected her of indolence, and her complaints being considered as a pretext for the non-performance of her duty, she was forced to undertake employments of the most laborious kind.

This treatment she supported with patience, though often ready to sink under its consequences. After any great exertion, she was frequently attacked with pain in the upper part of the abdomen, with vomiting, and a sensation, as she expressed it, of something dragging to the right side; which sensation she always referred to the region of the stomach.

The cessation of these symptoms used to be sudden, as their accession. After suffering severely, for a short time, all the pain and sickness ceased, and allowed her to resume her usual employments.

As her age increased, she became more liable to a repetition of these attacks; and, as they were also of longer continuance than in the early part of life, she was at length rendered incapable of labouring for her support.

Some days previous to her death, she was seized with the usual symptoms of strangulated hernia; viz., frequent vomitings, costiveness, and pain; the pain was confined to the upper part of the abdomen, which was tense and sore when pressed.

As these symptoms were unaccompanied with any local swelling which indicated the existence of hernia, they were supposed to be produced by an inflammation of the intestines; but there were other symptoms that could not be attributed to this cause, which occasioned much obscurity with respect to the true nature of the complaint, and seemed to indicate a disease in the thorax. She was unable to lie on her right side, had a constant pain in her left, a cough, difficulty of

breathing, attended with the same dragging sensation of which she had formerly complained.

The signs of inflammation of the intestines, with the addition of a troublesome cough, continued without abatement for three days, when she expressed herself better in these respects ; but the morbid symptom in the thorax remained as violent as at first ; and in the fourth day from their commencement she expired.

Dissection.—On examining the body after death, when the abdomen was opened, there appeared a very unusual disposition of the viscera. The stomach, and left lobe of the liver, were thrust from their natural situation towards the right side. On tracing the convolutions of the small intestines, they were found to retain their usual situation ; but lines of inflammation extended along such of their surfaces as lay in contact. This appearance the adhesive inflammation assumes in its early stage ; and it is highly probable, that, if the approach of death had been less rapid, these surfaces of the intestines would have been glued together by the effusion of coagulated lymph.

When the large intestines were examined, the great arch of the colon, instead of being stretched from one kidney to the other, was discovered to have escaped into the left cavity of the chest, through an aperture in the diaphragm. The cæcum and beginning of the colon were much distended with air, and appeared therefore larger than natural ; but the colon, on the left side, as it distended toward the rectum, was smaller than it is commonly found.

A small part only of the omentum could be discovered in the cavity of the abdomen, a considerable portion of it having been protruded into the chest, through the same opening by which the arch of the colon had passed. The displacement of the stomach, and left lobe of the liver, had arisen from the altered position of the colon and omentum ; which, in their preternatural course towards the diaphragm, occupied the situation of each of these parts.

When the chest was examined, the left lung did not appear of more than one-third of its natural size ; it was placed at the upper part of the thorax, and was united to the pleura costalis by recent adhesions. The protruded omentum and colon were found at the lower part of the left cavity of the chest, between the lung and the diaphragm, floating in a pint of bloody-coloured serum. The colon, in colour, was darker than usual ; in texture, softer, and distended with feculent matter mixed with a brownish mucus. The portion of the intestine contained within the chest measured eleven inches. The omentum was also slightly altered in colour, being rather darker than natural ; but, in other respects, this viscus was not changed ; it adhered firmly to the edge of the aperture, and more than half of its substance was contained within the chest.

The opening through which these viscera had protruded, was placed in the muscular part of the diaphragm, three inches from the œsophagus ; it was of a circular figure, and two inches in diameter ; its edge was smooth, but thicker than the other parts of the muscle.

The peritoneum terminated abruptly at the edge of this aperture, so that the protruding parts were not contained in a sac, as in cases of common hernia, but floated loosely, and without a covering in the cavity of the chest, of which they occupied so large a space, as to occasion considerable pressure on the left lung, and to produce the diminution I have before remarked.

The right side of the chest, also the right lung and the heart, were free from disease.

Could the precise nature of this disease be ascertained during the life of the patient, but little could be done for his relief; no more, than, perhaps, his own feelings would dictate, the refraining from all kinds of bodily exertion.

From Laceration.—The third cause of this form of hernia is wound, or laceration of the diaphragm, and the former inflicted with the small sword, has been the most frequent. The opening is at first prevented from closing, by the pressure of the abdominal viscera, which frequently protrude through it, in small quantity at first; but at length, should the patient survive, very large portions escape.

The only instance in which I have known this disease produced by accident, has been from laceration of the diaphragm, in consequence of the fracture of several of the ribs.

Case.—William Rattley, aged thirty, was admitted into Guy's Hospital, about one o'clock on February 5, 1804, having fallen from the height of about thirty-six feet, by which six of the lower ribs on the right side were fractured. When admitted, he breathed with great difficulty, and complained of excessive pain; the crepitus from the fractured ribs could be distinctly felt, and there was slight emphysema. Soon after his admission, he vomited violently, had frequent hiccough, and expired about eight o'clock on the following morning.

Dissection.—The following appearances presented themselves on inspecting the body after death. A small wound at the inferior and posterior part of the right lung, with some slight but recent adhesions between the two portions of pleura. On pressing down the diaphragm, a portion of intestine was discovered, in the cavity of the chest on the right side, of a livid colour. On examining the cavity of the abdomen, this fold of intestine proved to be a part of the ilium, which passed upwards behind the liver, through the lacerated opening in the diaphragm, into the chest. The aperture in the diaphragm was situated about two inches from the cordiform tendon on the right side, in the muscular structure; it was filled by the intestine, which was confined by a firm stricture. The laceration had been occasioned by the fractured end of the tenth rib. The other viscera of the abdomen were otherwise but little altered; but near a quart of bloody serum was extravasated into the cavities of the chest and abdomen.

OF THE MESENTERIC HERNIA.

Cause.—This hernia occurs in consequence of a natural deficiency of one of the layers composing the mesentery, or from an accidental aperture being made.

Formation.—The intestines force themselves into such an opening, and, quitting the proper cavity of the peritoneum, form a hernia, which may become of very large size, as the cellular union of the two layers is not sufficiently firm to offer much resistance to the pressure of the protruding viscera.

Case.—Mr. Pugh, of Grace-church Street, afforded me an opportunity of examining a hernia of this kind. The subject in which it was found, had been brought for dissection to St. Thomas's Hospital; and the man had been a patient under Mr. Forster, in Guy's Hospital; just previous to his death.

Appearances.—On opening the abdomen, and raising the omentum and colon, the small intestines were not to be seen, but a large swelling was discovered, situated over the lumbar vertebræ, and reaching to the basis of the sacrum; which, on further examination, proved to be a sac of peritoneum, containing the small intestines, and surrounding them completely, excepting at the posterior part, where the aperture by which the intestines had escaped, was situated.

From what I could collect of the previous history of the patient, he did not appear to have been much inconvenienced by this unnatural position of the viscera.

OF THE MESOCOLIC HERNIA.

The formation of this hernia is similar to that last described; and the first example I had an opportunity of examining, was, as the former, in a subject brought to the Hospital for dissection.

Appearances.—The abdomen having been opened, and the omentum and large intestines turned up, a tumour was discovered on the left side of the cavity, extending from over the left kidney, to the edge of the pelvic cavity, the lower portion being situated in the fold of the sigmoid flexure of the colon. The large intestines took their usual course, only that the cæcum was nearer to the centre than in common. On the left side, the colon was raised by the tumour. The duodenum, a small part of the jejunum, and termination of the ilium, were the only parts of the small intestines to be seen, on first opening the abdomen; all the rest being situated in the sac, having protruded by an aperture on its right side, which was large enough to admit two folds of intestine in a distended state.

The sac was formed by the peritoneal layers of the mesocolon.

Dr. Jones's Case.—Dr. Jones, of Barbadoes, sent me a drawing, exhibiting the larger part of the moveable viscera, between the layers

of the peritoneum, as found when examining the body of a patient he had attended.

OF STRANGULATION OF THE INTESTINE WITHIN THE ABDOMEN.

This I have known to occur in several different ways.

Causes.—First.—From the intestine protruding through an aperture in the omentum, mesentery, or mesocolon.

Second.—From the same circumstance occurring when small openings are left in the adhesions formed in consequence of inflammation.

Third.—From a membranous band formed at the mouth of a hernial sac, becoming elongated, and entangling the intestine when it has been returned from the hernial sac.

Fourth.—From the appendix vermiformis entangling the intestine.

Cases.—Mr. R. Croakes, surgeon, of Barnsley, in Yorkshire, sent me the account of a case in which a portion of intestine had been protruded through an opening in the omentum, and had become strangulated. The patient was eighty years of age, and had been previously very healthy and active. The case terminated fatally, two days after the commencement of the symptoms; and on examination after death, the intestine was found in a gangrenous state.

A case, in which a portion of small intestine had protruded through an opening in the mesentery, and become strangulated, occurred under the care of Mr. Palmer, of Hereford. The symptoms were severe, but the patient survived until the ninth day from their commencement.

Dr. Monro has related a case of this nature in his work on crural hernia.

Mr. Hodson, of Lewes, attended a young man who died in consequence of the strangulation of a fold of small intestine, which had protruded through an aperture left in an adhesion of the omentum to the peritoneum.

I have a very excellent specimen, showing the strangulation of intestine by elongated membranous bands. It was taken from the body of a patient of Mr. Weston's, of Shoreditch. The patient was eighty-five years of age, and resided in Hoxton Workhouse. He was seized with symptoms of strangulated hernia, in consequence of which Mr. Weston was sent for, who, on examining the man, found a hernia on the right side, which he soon reduced by the taxis. The symptoms, however, continued, and the patient died. On examining his body after death, I found that the intestine had been returned into the cavity of the abdomen, but that two folds of it were entangled and strangulated by a long membranous band.

Specimen in Guy's Museum.—In the Museum at Guy's Hospital is a beautiful preparation, showing a considerable portion of the small intestine, surrounded and strangulated by the appendix vermiformis;

but I am not acquainted with the history of the patient from whom it was taken.

As the precise nature of any of the above cases could not be ascertained during the lives of the patients, no benefit could be derived from surgical aid.

LECTURE XXXVI.

ON WOUNDS.

Of Four Kinds.—SOLUTIONS of continuity on the surface of the body are of four kinds, according to the manner in which they are produced ; viz., Incised, Lacerated, Contused, and Punctured.

Incised, when produced by a cutting instrument ; lacerated, when the parts are forcibly rent asunder ; contused, when occasioned by some heavy body, or one passing with great velocity ; and, punctured, if made by a pointed substance.

This division of wounds is attended with advantage in the description of their treatment, as it must in some degree vary from the mode of their production.

OF THE INCISED WOUND.

Character.—The lips of the divided parts are more or less separated according to the extent of the injury ; and, the division of the muscles, which, by their contraction, lead to a gaping state of the wound, as in the cheek, the lips, or in transverse incisions in the limbs.

The wound is covered with blood, which is florid or purple, as an artery or vein has been injured. If an artery, the blood flows by jets rapidly, and is of a florid colour ; if a vein, the bleeding is slow, gradually filling the wound, and the blood is of a purple colour. Fainting is produced if an artery be cut, but rarely, if the bleeding be venous. Fainting also results if the wound extends to parts of vital importance, even although the hæmorrhage be very slight.

Treatment.—When you are called to a case of incised wound, you are to make pressure upon its surface with a sponge to arrest the hæmorrhage, and if the divided vessels be small, you will soon find it subside under a steady and continued pressure. But if an artery of any magnitude has been injured, it should be drawn from the surrounding parts by a pair of forceps, or raised by a tenaculum, and then tied with a very fine ligature ; one end of which should afterwards be cut off,

that no more space than is absolutely necessary may be occupied by the thread or silk.

So soon as the bleeding ceases, the coagulated blood is to be completely sponged away from the surface and edges of the wound, the edges are to be brought together, and a strip of lint or linen moistened with the blood, is to be placed on the part in the direction of the wound, when the blood, by coagulating, glues the edges together in the most efficient and natural manner; adhesive plaster is to be applied over the lint with spaces between to allow of the escape of blood or serum.

How closed.—In a few hours, inflammation arises, and fibrin becomes effused upon the surface and edges of the wound, by which they become cemented.

Organized.—In a few days, vessels shoot into the fibrin, effused by the inflammation; and it becomes organized with arteries and veins, and, after a time, with absorbents and nerves; thus the structure of the part is restored.

Wound of Muscle.—If the wound be in a muscular part, more especially in transverse wounds of muscles, it is required that the position of the limb be carefully attended to, that the wounded muscle may be relaxed as much as possible, and its separated portions approximated. Thus, if the biceps muscle were divided in the arm, the limb must be bent at right angles; and if the triceps be injured, extension will be necessary.

Sutures required.—But if the wound has happened in a muscular part, which is not supported, as in the cheek, a suture is required to preserve approximation; the thread employed should be as fine as possible, and only as many as are absolutely necessary, to produce the desired effect, should be inserted.

If a wound be angular, and of considerable extent, a suture at the angle is desirable, or the edges will seldom be returned in their proper situation.

Not Injurious.—It is quite a mistake to suppose that sutures are injurious, and that they should be never used; for a wound often heals better with a suture and a cooling lotion, than with adhesive plaster. Indeed, adhesive plaster should not be applied to the edges of wounds. Often have I seen it produce erysipelas, and sometimes the erysipelas followed by the death of the patient. After the removal of a large tumour from the breast, I often employ a suture to keep the parts in exact contact, and to prevent the edges from becoming inverted.

Reproduction of Parts.—When the wound is healed, the parts wounded are generally reproduced. The cutis, and cuticle, easily; the rete mucosum, more slowly. The cellular membrane is for some time indurated, and requires the use and motion of the parts, to be completely evolved.

A number of branches of arteries and veins are formed instead of the original trunks. Nerves are reproduced. Tendons are also again formed. Bones are united by bone.

Muscle not reproduced.—But some parts are not reproduced. There

is a specimen in the Collection at St. Thomas's Hospital, in which a wound of a muscle is seen united by a tendinous structure. There is also a specimen of a cartilage of a rib united by bone, but in young persons cartilage is reproduced.

Parts nearly separated unite readily.—Parts which are nearly separated readily unite, as the finger or the nose when it has been cut, or torn, and a suture is required to aid its union.

Parts entirely separated will unite.—Parts entirely separated in other animals sometimes unite. Mr. Hunter removed the spur of a cock, and placed it in the comb by incision, where it not only adhered, but grew. He also removed the testis of a cock, and placed it in the belly of a hen, where it adhered. A tooth extracted from the human subject, and placed in the comb of a cock, adheres there.

The only instance in which I have seen a part removed entirely, and afterwards adhere, was in the following case:—

I amputated a thumb for a patient in Guy's Hospital; and, finding that I had not preserved a sufficient quantity of skin to cover the stump, I cut out a piece from the thumb which I had removed, and applied it upon the stump, confining it by strips of adhesive plaster. On taking off the dressings a few days after the operation, I found, that the portion which had been completely separated, and afterwards placed upon the stump, was firmly united and organized.

The most extraordinary instance of the union of a separated part has been related by Dr. Balfour, in the *Edinburgh Medical and Surgical Journal*, for October, 1814, from which the following account is taken:—

Case.—"On the 10th of June last, two men came to my shop about eleven o'clock in the forenoon; one of whom, George Pedie, a house carpenter, had a handkerchief wrapped round his left hand, from which the blood was slowly dropping. Upon uncovering the hand, I found one half of the index finger wanting. I asked him what had become of the amputated part. He told me that he had never looked after it, but believed that it would be found where the accident happened. I immediately despatched his companion to look for it, and to bring it to me directly he found it. During his absence I examined the wound, which began near the upper end of the second phalanx on the thumb side. The wound which had been inflicted with the hatchet was quite clean.

"In about five minutes, the piece of the finger was brought; it was quite cold, and white in appearance, like a bit of candle. I immediately exposed both surfaces to a stream of cold water, to wash the blood off the one, and any dirt that might adhere from the other. I then applied, with as much accuracy as possible, the wounded surfaces to each other, expressing a confident opinion, that reunion would take place.

"I endeavoured to inspire the patient with the same hopes, but he did not appear convinced of the possibility of such an occurrence. I informed him, that, unless pain or fœtor, or both, should occur, I would

not remove the dressing for a week at least. I directed him to keep his arm in a sling, and not to attempt any kind of work ; to which he promised obedience. He called on me the next day, when he was quite easy, but the wound had bled a little. Although he promised to call on me daily, I did not see him again till the fourth of July. I had concluded that he had applied to some other practitioner ; but, on the second of July, a gentleman called on me, and gave me the following account of that patient :—

“ Two days after the accident, the patient, under the influence of the ridicule of his acquaintance, for giving credit to my assurances, applied to another practitioner ; who on learning the history of the case, represented the impropriety of any one but myself intermeddling with it. But, prepossessed with the belief that he carried about a portion of dead matter tied to the stump of his finger, the man insisted upon having the bandage removed, which was accordingly done. Thus were nearly rendered abortive my attempts to produce reunion of the parts, and the profession deprived of a fact, which, as demonstrating the powers of nature to repair injuries, is inferior to none in the annals of the healing art. Fortunately, however, nature had been too busy for even this early interference to defeat her purpose,—adhesion had taken place.

“ In consequence of the information I got from this gentleman, I found out the patient on the fourth, when re-union of the parts was complete. The finger was in fact the handsomest the man had, and had recovered both heat and sensation. In the progress of the cure, the skin was changed, and soon after the accident the nail fell off.

“ From the account of persons present when the injury was inflicted, I am satisfied that twenty minutes must have elapsed before the parts were replaced ; for the patient did not come to me immediately upon receiving the injury, but waited a considerable time in the building where the accident happened.

“ The amputated part, as measured by the patient himself, was one inch and a half long, on the thumb side, and one inch on the opposite side.”

Adhesion prevents Danger.—When adhesion of the incised wounds can be completely effected, the danger ceases. An incised wound into the abdomen, exposing its different viscera, is not followed by danger if the wound is made to unite. Wounds of the chest, even complicated with injury to the lungs, cease to be dangerous under the adhesive process. Wounds of the brain will unite by adhesion, and the patient recover.

Adhesion prevented.—Union by adhesion is prevented by the following circumstances in incised wounds :—

By Sutures.—1. By the introduction of many, and of large sutures. It is therefore necessary to employ the finest threads, and to cut off one of their ends, that they may occupy as little space as possible ; and in from four to six days, they should be removed ; thus they are prevented from producing suppuration and ulceration.

By too much Inflammation.—2. By the inflammation being suffered to run too high from want of bleeding generally, or, locally, by leeches; or, from not employing cooling evaporating lotions. Spirits of wine and water, or acetate of lead and water, should be applied upon the wound, and around it. Purging is also often required.

The adhesive inflammation is but a slow degree of action, and if it be not kept in bounds, suppuration will occur.

By Poisons.—If poisons be introduced into wounds, it will be wrong to attempt to produce adhesion; thus the bite of a rabid animal should be excised, as well as cauterized afterwards, to prevent the terribly dangerous consequences of such an injury.

By Caustics.—The use of caustic applications, whether by potash, nitric acid, the actual cautery, &c. will necessarily prevent adhesions.

When an Absorbent is divided.—When many absorbent vessels are divided, the lymph poured out by them prevents adhesion, as I have seen in a transverse wound in the groin.

Or a Secretory Gland.—When the secretory glands are wounded, their secretion prevents union.

Case.—I was called to a gentleman who fell upon his face on an earthen plate, which he broke; his face was dreadfully wounded; I brought the parts together, and in ten days they appeared to be united, when I allowed him to eat; but the result was a profuse discharge of saliva from the wound, which was a very long time in healing, on account of the parotid duct having been cut across.

By the Surgeon's Imprudence.—Union by adhesion, is often frustrated by the surgeon's impatience; he is anxious to see if union be effected or not, and most absurdly and mischievously raises the dressings, disturbing, and often breaking, the adhesions, and thus rendering the process of granulation necessary, when it might have been avoided.

By State of Constitution.—The adhesive inflammation is often prevented by the state of the constitution: if the patient be much out of health, or if he be extremely irritable, the inflammation will proceed beyond the bounds of adhesion, and suppuration will take place. In such persons, evaporating lotions to the wound, and opium internally, are the means of arresting the mischief which will otherwise ensue.

Adhesion not always desirable.—It is not always an object to endeavor to produce adhesion; when there is much loss of substance, and the parts must be forcibly drawn together, much additional pain and irritation are occasioned by the attempt at adhesive union, and this is more especially the case in children, when the skin cannot well bear the application of the adhesive plaster. I therefore, when I remove those marks which are called *nervi materni*, do not attempt to bring the edges of the wound together; but only, after the bleeding has ceased, apply lint for twenty-four hours, and then a poultice to the part by which much pain and irritation are avoided. The breast I often dress in the same manner, after the removal of tumours connected with much disease of the integument.

OF LACERATED WOUNDS.

Character.—These wounds bleed much less than the incised, for a reason which will be described when we speak of wounds of arteries ; but here it is sufficient to say, that the largest arteries of limbs may be torn through without any dangerous bleeding occurring.

Differ from incised.—Lacerated wounds also differ from incised, in their often containing extraneous bodies. Those of the scalp are frequently filled with dirt, from the head ploughing the ground, and the utmost care is required to cleanse them with warm water, and to remove with a sponge all extraneous matter, as I have seen such a wound adhere, and afterwards suppurate in various places, for the discharge of the foreign bodies which the adhesive matter had at first confined.

More disposed to inflame.—Lacerated wounds are more disposed to inflame, than the incised, and they require much more attention to the use of evaporating lotions, and of leeches to suppress it.

Affect the Nervous System.—The nervous system frequently suffers severely from lacerated wounds. Spasms of the limbs, and tetanus, I have often seen follow these lacerations on the hand.

Case.—I was sent to see a young gentleman at Marlow, who had fallen into a hedge and torn his hand with a thorn-bush ; he died from tetanus. In the hospitals, from lacerated wounds of the fingers, made by machines for combing wool, I have several times known tetanus produced ; the tendons and fascia in these cases had been much exposed and injured.

Produce Erysipelas.—Erysipelas is not an unusual effect of lacerated wounds, more especially if they are inflicted on the scalp, and they therefore require great attention, although they at first appear of trifling importance.

Treatment.—The treatment of these wounds is the same as that which has been described for incised wounds ; but more care is required in the use of cooling lotions, and the application of leeches, in quiet, and in the exhibition of opium under the first appearance of spasmodic symptoms.

Patients with lacerated wounds should not be much reduced by depletion, as it disposes to tetanic symptoms.

LECTURE XXXVII.

ON CONTUSED WOUNDS.

Character.—THESE injuries differ from the incised and lacerated wounds, in being accompanied with disorganization ; blood is extravasated, the cellular tissue is broken down, muscles are bruised, and many parts disorganized.

Process of Reparation.—The process of restoration is therefore quite different to that which takes place after incised or lacerated wounds.

Sloughing.—Inflammation to a considerable extent must be produced ; the dead parts must be separated by a process of ulceration, and granulations will arise to fill up the cavities occasioned by these separations. The surgeon, therefore, who treats these wounds as he would the incised or lacerated, has still to learn the fundamental principles of his profession.

Contused wounds bleed but little, from the organization of their parts being destroyed, and from the extravasation making pressure upon the vessels which are divided.

Treatment.—The treatment of the contused wound in principle, consists in facilitating the separation of the contused parts, instead of approximation, as in the incised and lacerated wounds. To effect this object, and to expedite the process, fomentation and poultices are to be used, which lessen inflammation when too violent, and hasten the suppurative and ulcerative processes. If the inflammation be still considerable, leeches should be applied ; but bleeding ought not to be had recourse to from the arm, for all the powers of the constitution are required to assist in the process of separation, and of granulation.

Medicines.—The bowels should be kept regular ; but opium should be combined with the medicines given, to effect that object. If the constitution become much debilitated, the sulphate of quinine may be given ; or ammonia, combined with opium.

Applications.—When the sloughing, or suppurating process is completed, the fomentations and poultices are to be abandoned, and the parts may be approximated by adhesive plaster, or simple dressing be applied to the wound, treating it as a simple ulcer.

OF PUNCTURED WOUNDS.

Danger of.—These wounds are produced by pointed bodies, as needles, scissors, hooks, points of broken bones. &c. ; and the effects

which follow them are often highly dangerous, by occasioning inflammation of the absorbents ; or when tendinous structures or nerves are injured.

OF THEIR EFFECTS UPON THE ABSORBENTS.

A slight wound through the skin into the cellular tissue, will be sometimes followed by severe pain in the part, a blush around it, and by the absorbent vessels forming red lines, from the wound to the absorbent glands, in which they terminate.

Consequences.—Of this effect I have seen very many examples, and I have been a sufferer from it myself. Abscesses sometimes form upon the absorbents, in their course to the axilla, or to the groin ; and sometimes in the glands in which they terminate ; and in very irritable persons death sometimes ensues ; and the following example of it I had an opportunity of inspecting.

Cases.—A West Indian, studying at Guy's Hospital, wounded his finger, the absorbents of his arm became inflamed, and he laboured under excessive irritative fever ; the veins seemed to suffer also from inflammation communicated to them, for his limbs became almost incapable of motion, from the violent pain produced by bending any of the joints, and the superficial veins of his limbs were very tender when pressed. He died in six days after the attack, and I inspected his arm. The absorbents of the limb were highly inflamed ; and in the axilla matter was effused, not in a separate abscess, but in a sheet of suppuration in the cellular tissue, between and around the absorbent vessels. I was not permitted to inspect the body further.

After an inflammation of this kind in myself, produced by wounding my finger when opening the body of a man executed on the same morning ; my throat became sore as the inflammation in the absorbents of my arm subsided, and one of my knees became stiff from rheumatism ; when this was subdued by a blister, the other knee became similarly affected.

Poison Absorbed—It would seem that under certain circumstances a poison is produced sufficiently strong to excite inflammation, even when there is no wound.

Case.—Mr. Cook, surgeon, at Marsh-gate, Westminster Bridge, sent to me whilst he was labouring under the highest irritative fever, in consequence of having opened the body of a person who had died of puerperal fever. When I examined him, I found the extremities of his fingers of both hands inflamed, as if they had been dipped in scalding water, and the absorbents of his arms red, hard, and knotted, to the axilla ; yet he had not any wound or abrasion of any kind upon his hands ; and it would therefore seem, that the fluid produced in the abdomen of this woman, in which his fingers had been frequently immersed, was of a highly stimulating nature.

Form of Wound and state of Constitution.—The effect of punc-

tured wounds depends, however, very much upon the form of the wound, and the state of the constitution. When punctures have been made, by a clean needle, the tongue of a knee-buckle, a fragment of bone, &c., nothing can be introduced of a poisonous nature, and the effect must depend upon the form of the wound, and the structure injured. But the effect also depends upon the state of the constitution, as is evinced in our young students suffering in the Spring, after confinement in London, in the air of our dissecting-room, and in the wards of our hospitals, and by their escaping these violent symptoms in the Autumn, when they have just quitted the country.

I believe, therefore, that these effects arise from the form of the wound, and the state of the constitution ; also occasionally, but rarely, from the introduction of an irritating fluid, the result of peculiar inflammation, or the production of the first stage of putrefaction.

Bites of Dogs and Cats.—I have known the bites of cats, dogs, and rats, followed by high inflammation, and constitutional irritation, many days after the injury has been inflicted ; and these cases unite the symptoms of punctured and contused wounds ; the first effects upon the constitution arise from the punctures of their pointed teeth ; but when the symptoms produced from this cause subside, from fifteen to twenty days after, I have known the injured parts inflame and slough ; the constitution, as well as the part, undergoes great changes, and the patient becomes excessively reduced.

Treatment.—The treatment of punctured wounds consists in adopting the following plan :—

First.—A lancet should be used to extend the puncture to an incision.

Second.—The surrounding parts should be pressed to remove, by the blood which issues, any extraneous matter which may have been introduced. If the finger is wounded, a piece of string or tape should be bound tightly round the injured finger, from its junction with the hand, as far as the wound, so as to force out blood from the opening.

Third.—The nitric acid, nitrate of silver, or caustic of potash, should be applied to the wound.

Fourth.—A lotion composed of the subacetate of lead ; spirits of wine and water should be applied over the part, to prevent too much action when inflammation begins.

Fifth.—Leeches should be applied, and fomentations with poultices employed, if the pain and inflammation become considerable.

Sixth.—Give calomel and opium at night, and a brisk purgative in the morning.

Seventh.—Let the limb be supported on an inclined plane, so that the blood shall gravitate towards the body ; all stimulating food and drink should be avoided ; a measure so absurd that a caution against it appears unnecessary ; but an anatomist killed himself by taking wine to oppose the putrefactive influence of the matter he supposed to be absorbed.

Inflammation returns.—The inflammation from punctures of the

hand in dissecting, will continue a long time, and be resumed when it seems to be at an end ; attention to the general health, and to the part, must be therefore regarded closely, for a considerable period after the injury.

OF PUNCTURED WOUNDS OF TENDINOUS STRUCTURE.

Danger of.—If fascia be punctured, alarming symptoms will sometimes arise, in part from the form of the wound, from the feeble power of the structure, and partly from the confinement of matter beneath the fascia.

Form of the Wound.—The form of the wound produces these symptoms, because the parts are rather forcibly separated than actually divided, and consequently the adhesive process does not readily succeed. The structure of tendons and fasciæ, from their little vascular organization, and difficult restoration, leads to much constitutional effort ; and the form of fascia tends to confine the pus when it is secreted.

Case.—A gentleman sat upon a rail, from which a nail projected, and it entered the middle and back part of his thigh ; great irritative fever followed, with redness and swelling of the thigh ; and, as fomentations and poultices, and calomel with opium, did not relieve him, I made an incision in the situation of the puncture, and found that the nail had penetrated the fascia lata ; I divided it freely, when some pus, which had formed under it, was discharged. He quickly recovered.

Early Incisions.—When a puncture is made into a theca, suppuration is apt to ensue, when an early incision, by allowing the discharge of the matter, prevents the greatest mischiefs.

If matter forms under the aponeurosis of the palm of the hand, an early incision is the only mode of relief, if the puncture which occasioned the suppuration is too small to admit of the escape of the pus.

Treatment.—The treatment, therefore, of these wounds, consists in endeavouring to prevent suppuration by leeches, and evaporating lotions, in the first instance ; but, if matter does form, to open the abscess early, both with a view of making the punctured and incised wound, and to give a free outlet for the escape of the pus.

ON THE EFFECTS OF PUNCTURED WOUNDS ON THE NERVOUS SYSTEM.

Tetanic Symptoms.—The spasmodic and tetanic symptoms, which follow punctured wounds, are the effects of injury to tendinous, rather than nervous parts. Most of the cases of tetanus which I have seen occur from punctured wounds, have been when the hand or foot has been the seat of injury ; the aponeurosis of the palm, or sole, or the tendons being hurt. I will not deny that an injury to a nerve will

produce the same effect ; but I cannot help doubting its being the usual cause.

Cases.—I divided the posterior tibial nerve in a Mrs. Sabine, the wife of a surgeon at Dunchurch, for a painful tumour on it ; and little constitutional irritation was produced by the operation.

I removed a tumour from the median nerve of a gentleman, and cut away two-thirds of the thickness of the nerve, leaving one-third ; tingling of the fingers, with some partial numbness, followed, but no constitutional irritation ; and he did very well.

I cut out five-eighths of an inch of the radial nerve, for aura epileptica ; and no unpleasant symptom followed, but the patient got well.

Mr. Key removed a portion of the cubital nerve, for aura epileptica ; and, although it did not cure the woman, it produced no unfavourable symptoms.

These instances, to which many more might be added, as well as the usual seat of the wound, which produces tetanus, leads me to believe that it is rather the result of injury to tendinous than to nervous structures.

Extensive injuries, by their sympathetic influence, and by their severe shock to the nervous system, produce the destruction of life, even without vascular re-action or inflammation.

The symptoms which arise are sometimes only general spasm, sometimes trismus, and sometimes tetanus.

Cases.—I once saw a body die, in a few hours, of the most violent spasms of most of the muscles of his body, from the pointed extremity of a broken thigh bone having penetrated the under side of the rectus femoris.

I saw a person die from spasm, produced by a punctured wound in the triangular ligament of the pubes, from a sharp piece of wood ; and I have seen a great number of such cases from injury to the hand and foot.

Degree of Spasm varies.—Sometimes, instead of this general spasm, the influence of the wound is particularly felt in the muscles of the jaw, producing trismus, with the subsequent affection of the muscles of volition, and afterwards those of respiration, constituting tetanus. Sometimes the muscles of the posterior part of the trunk are more particularly affected, when the term *opisthotonos* is applied to the disease ; and sometimes, on the contrary, the muscles of the anterior part are chiefly attacked, when the disease is named *emprostotonos*. In the first case, the body is curved forcibly backwards ; and, in the second instance, forwards. The muscles of the extremities become also extremely rigid and contracted, so that the joints cannot be moved ; and, in the greater number of cases, life is destroyed in a few days.

Tetanus, acute and chronic.—However, it may be observed, that there are two kinds of tetanus ; one of an acute form, which generally terminates the patient's existence ; and the other, of a chronic nature, which, after a time, is often recovered from.

Treatment.—The treatment which I have seen pursued in acute tetanus, has been,

Warm Bath.—The warm bath, which gives a temporary tranquillity, and slightly reduces the spasms ; but is not followed by any permanent good effects.

Bleeding.—Bleeding, which hastens the patient's death ; it reduces the powers of the body ; and, although the spasms are less violent, they destroy sooner.

Opium.—Opium I have generally seen given ; but, in acute tetanus, never with any other advantage than a slight mitigation of the symptoms for a short period. I once saw Mr. Stocker give, at nine o'clock in the evening, half an ounce of tincture of opium, and at eleven o'clock an ounce more, without any permanent beneficial influence. To me, it appears to be absurd to resort to a treatment which has been repeatedly found to be inefficacious.

Tobacco.—Tobacco injections I have seen used, but with no permanent advantage.

Digitalis.—Digitalis I have known employed, but uselessly.

Cold.—Ice I have seen extensively applied ; but all these means, in acute instances, fail.

Case.—Mr. Ward, of Gloucester, has lately published two cases, which were relieved by the hydrocyanic acid.

Treatment of Chronic Tetanus.—Chronic tetanus I have known relieved by calomel and opium, by the cold and shower baths, by large doses of the tincture of muriate of iron ; but I have also known persons recover who had scarcely taken any medicine ; thus throwing a doubt upon the efficacy of those which had, in other cases, been supposed to be beneficial.

Trismus rarely Fatal.—In every instance, in which I have witnessed the existence of trismus, the patient has recovered. Calomel and opium are the best medicines ; and a blister to the head the most efficacious local remedy.

The following interesting case occurred in St. Thomas's Hospital, under the care of Dr. Elliotson and myself :—

James Frazer, æt. thirty-nine, of florid complexion, and robust appearance, employed in the London Docks as a porter, was admitted December 10. There were observed two small lacerated wounds on the inside of the ball of the left great toe. No crepitus indicative of fracture could be discovered. There was a slight degree of swelling, attended with violent pain.

He stated, that his toe had been dislocated, and thrown outwards, across the other toes, by the fall of a piece of timber. It had been, however, forcibly reduced, by a person present, while he was in a fainting condition. He was brought to this Hospital immediately after.

The edges of the wounds were brought together, a dossil of lint was

placed over them, and afterwards covered by a light poultice : the foot elevated on a pillow.

Cap: haust: purg: statim.

December 11. Evening. He was restless, with a pain in his head, back, and loins. Skin hot and dry; pulse full and hard, about eighty; tongue furred in the centre, and red at the sides; bowels costive.

Venesection ad \bar{z} xij.—Repet: haust: purg.

The dressings were removed from the foot, which was ordered to be fomented all night.

About an hour after the bleeding, the violence of the symptoms abated, and the man said he felt relieved.

December 12. Slept comfortably last night. Skin moist; pulse full and soft; tongue white; bowels have been opened.

The foot is very painful; the wounds are beginning to suppurate; the dorsum of the foot is red, tense, and swollen.

Applic: Hirudin: xij.

Capt: cal: gr. ij opii gr. 1-2 o. n. inf: rosæ c. mag: sulph: t. d.

The blood abstracted yesterday neither cupped nor buffed.

December 14. Was very restless. Skin dry; pulse smaller and quicker; bowels costive.

Foot very painful; still red, tense, and swollen; wound suppurating.

Repet. hirudin. xij.—Repet: haust: purg.

December 19. Face flushed; skin moist; pulse small and quick; tongue white and furred; bowels relaxed.

Foot very painful, so much so as to disturb his rest, the wounds suppurating, and the degree of inflammation less.

Omit: calomel and opium.

Capt. Tinc: opii gtt. xxx. Si opus sit.

Foot to be fomented and poulticed as before.

December 22. Diarrhœa subsiding; but he laboured under great irritation both of body and mind.

December 24. Imperfect trismus came on yesterday afternoon, and increased towards this morning. He could not open his mouth more than three-quarters of an inch, nor protrude his tongue further than the teeth. Deglutition painful, and articulation difficult; pain in the back of the neck, and a want of freedom in the motions of the head; no rigidity of the muscles; countenance anxious, and spirits very much dejected; skin bedewed with moisture; pulse quick, small, and compressible, 132; diarrhœa had ceased.

The wounds were suppurating healthily; granulations at the bottom ruddy; but perhaps the discharge was somewhat thinner; tension and swelling on the dorsum of the foot remained, but the redness was less.

Capt. ol: terebinth: \bar{z} ij statim.

Ferri: subcarb: \bar{z} ss. 2d qque hora (in treacle).

Applications to the foot as before.

December 25. Took the same quantity of ol. terebinth. at 10½ last night, which was followed by five or six copious dejections, but he

was not able to swallow more than one dose of the ferri subcarb. on account of its thickness. He therefore took five grains of musk every four hours ; this he commenced at twelve o'clock last night, and took four doses of it.

Mouth more closed ; a perfect inability to swallow any thing but liquids ; complains of pain in the back ; the other symptoms of trismus the same.

Did not rest last night ; face flushed ; skin very moist ; pulse the same.

The foot remained the same.

To omit the musk, and to take the iron mixed up with his beef tea, every two hours, as before ordered.

Capt. vin. rub. \bar{z} iv. — Strong beef tea, \mathfrak{h} iv. daily.

December 26. Mouth more closed ; other symptoms of trismus the same ; belly rigid in a slight degree.

Was restless last night ; countenance anxious, and spirits much depressed ; face flushed and hot ; pulse the same ; bowels opened twice during the night ; troubled to-day with tenesmus and prolapsus ani.

Foot very painful, and appeared the same as yesterday.

December 27. The symptoms of trismus the same as yesterday ; the belly more rigid, and he complained of a stiffness in the back, and a shooting pain through the scrobic: cordis. ; his face not so hot or flushed ; had no stool for the last twenty-four hours ; tenesmus and prolapsus ani continued ; perspires a good deal at night, and doses a little.

Foot very painful. While removing the poultice this morning, an abscess over the metatarsal bone of the great toe burst, and discharged an ounce or more of matter, of a greenish colour, streaked with blood.

Enema commune statim.

This produced one or two small evacuations. Hitherto (according to the nurse's account,) the fæces have been of a natural colour, but to-day they presented the appearance of the ferri. subcarb.

December 28. Morning. Mouth more closed ; deglutition more difficult ; articulation less distinct ; the belly rigid, and there has been during the night convulsive movements in the muscles of the neck.

Had no rest last night, and perspired a little ; his skin now cool ; pulse 112, very weak and small ; tenesmus has subsided.

About half an ounce of pus was evacuated from the dorsum pedis (near the metatarsal bone of the little toe,) there was a fetor arising from the wounds on the dorsum of the foot, while the original wounds were looking healthy.

Afternoon of the same day, all the alarming symptoms abated ; his skin became moist : his pulse fuller and softer, and his mouth more open, with an improved countenance.

December 29. Mouth more open ; swallowing easier ; no pain in the back of the neck, nor any more convulsive movements about the muscles of that part ; belly soft.

Slept last night, and perspired a little, and had two motions from an enema; countenance improved; face not so flushed; skin cool and dry; pulse fuller and softer, but still weak; appetite beginning to manifest itself.

Tension on the dorsum pedis quite subsided. The surface is still inflamed, but the redness is of a darker colour. The two wounds on this part looking very unhealthy, and the discharge fetid and rather thin. The original wounds on the side of the great toe are beginning to cicatrize.

December 30. Mouth more open; less difficulty in deglutition, and a more distinct articulation; no pain in the neck or back; the belly however is rigid.

Was very restless all last night, his foot being very painful; skin cool; pulse contracted and more distinct, about 120; during yesterday passed some small lumpy fæces.

The foot tense, red, and swollen; the discharge has ceased, and there was a fetor arising from the wounds, which were looking unhealthy, accompanied with severe lancing pains. The original wounds, however, were healing. Foot to be fomented.

Capt. ol. ricini $\overline{3}$ ss.

Enema cathart: si opus sit.

Beef tea, $\overline{1}\overline{b}\overline{v}\overline{j}$, instead of $\overline{1}\overline{b}\overline{iv}$.

December 31. The castor oil operated five or six times, bringing away small lumpy fæces. The enema was not administered.

Opened his mouth readier, but not wider; complained of pain running through the scrob. cordis, and of a dry cough, which arose, he said, from his not being able to breathe freely; deglutition and articulation better.

Slept better last night, and did not perspire; countenance and spirits improved; skin cool; pulse 120, softer, and not so contracted.

Foot less tense and inflamed; discharge from the wounds returned, but it is still too thin; leg placed in a fracture box.

January 1. Symptoms of tetanus quite subsided, those of trismus less violent.

Much the same as yesterday; pulse 108, soft and more full; bowels relaxed, with tenesmus; motions come away of a dark colour, and in very small quantities.

Foot better; discharge more copious and healthy.

Capt. ferr. subcarb. $\overline{3}$ ss. 4tu. q: q: horâ, (in powder.)

January 2. The same as yesterday; opened his mouth wider, but was still obliged to be very careful in swallowing.

Foot looking better; the excess of inflammation quite subsided; the suppuration free and healthy. It was painful last night, and this prevented his sleeping.

January 3. Much improved; pulse ninety-nine, softer and fuller.

Suffers very much from a collection of the iron in his rectum, a quantity of which was removed in a partially dry state; this prevented his sleeping last night.

Capt. ferr. subcarb. 6ta. q: q: hora, (in treacle.)

Enema commune — pro re nata.

Foot improving; discharge healthy and free.

The fracture box removed.

January 4. Same as yesterday.

January 5. Much improved; pulse eighty-eight, a great deal softer and fuller; has removed a very large quantity of iron from his rectum.

From this period he gradually recovered, without any further relapse; he continued, however, for some time, to pass portions of the subcarbonate of iron with his stools. The sudden improvement of the patient on the evening of the 28th, after the evacuation of the pus from the dorsum of the foot, cannot fail to strike any one, who may carefully peruse the above account; and I think it will require further trial of the iron before its efficacy in this formidable disease can be relied on.—T.

LECTURE XXXVIII.

ON WOUNDS OF ARTERIES.

Incised.—THESE wounds we shall divide, as wounds in general, into the Incised, Lacerated, Contused, and Punctured.

When an artery is cut into, or divided, the immediate effect of such injury is to occasion an impetuous hæmorrhage of florid blood, which, if the artery be large, whizzes through the wound. It flows in pulsation in obedience to the action of the heart.

If the wounded orifice, nearest to the heart, be compressed, the blood from the opening most remote from the heart, flows in an uninterrupted stream, and is of a dark venous colour, owing to its having passed through capillary vessels.

Fainting produced.—The brain soon ceases to be supplied with blood, and fainting is produced: sensation and volition become suspended; and the action of the heart is in a great degree suppressed; the flow of blood from the wound becomes much diminished, and sometimes entirely ceases.

Recovery from Fainting.—In a few minutes the patient opens his eyes, and the power of the nervous system is restored.

Modes of Arresting the Bleeding.—The mode by which bleeding is arrested may be either constitutional or local. Fainting is the constitutional mode, by suspending the voluntary and involuntary functions, more especially in the diminution of the action of the heart, so that the blood scarcely reaches the wound, but it undulates in the heart, and large vessels under the fluttering of the heart.*

* The brain and nervous system are, however, sometimes so depressed, that without stimuli to the stomach and nose, the person will not recover.

Local Means.—The local means consist in, first, the coagulation of the blood, which is effected in the cellular tissue around the artery, and also in the extremity of the wounded vessel, forming a plug; so that there is a continuation of coagulum from the outer surface to the orifice, and this sufficiently opposes the issue of blood under the enfeebled action of the heart.

Contraction of the Vessels.—But this process is also aided by the contraction of the artery, not particularly at the divided part, but also to a considerable extent from the orifice.

If the carotid artery, on one side, be cut across, and examined after the death of the animal, the artery is found much smaller on the wounded side than on the other which has not been injured. This state of the vessel lessens the influence of the blood upon the wound.

Retraction of the Vessel.—A retraction of the artery also follows when the division of the vessel is complete; and, by withdrawing itself into the cellular membrane, the blood becomes effused around it, so as to compress its orifice. Thus, then, it appears that coagulation with contraction and retraction of the vessel, all concur to put a check to the process of bleeding.

Process of Inflammation.—These, then, are the immediate means; but it is required that a further process should take place, to render their effects permanent. Inflammation follows; and the clot of blood becomes glued to the inner surface of the vessel, whilst effusion into the surrounding parts creates pressure upon the artery so as to diminish its calibre; this inflammation also usually produces a union of the edges of the wound, or otherwise granulations arise, fill it, and thus it becomes closed.

Pressure.—The treatment, when an artery of not a very large size is divided in an extremity, is to apply a tourniquet to compress the trunk from which it is supplied; this, with gentle pressure on the wound, for a short time, will generally command the hæmorrhage, when the edges of the wound may be approximated, and union promoted, leaving on the tourniquet, so as to continue a moderate pressure on the trunk.

Application of a Ligature.—But, if the vessel be large, it is necessary to make an incision in the direction it takes, so as to expose the wounded portions, when a ligature must be placed above and below on each portion of the vessel. The ligatures should be small, and one of the ends removed after their application. Dr. Vetch first recommended the removal of one of the threads.

When an artery is not completely divided, its retraction is prevented, and a coagulum, with difficulty, forms in it, and, when formed, is easily forced off by the action of the heart. Hence, in a week or ten days after the injury, bleeding will sometimes occur; and repeated hæmorrhage will destroy the patient if a ligature be not applied. I have known the temporal artery bleed eleven days after its partial division, and when the wound in the integument was almost closed.

The treatment of this injury consists in completely dividing the

vessel, when its retraction enables a coagulum to form in and around it ; but, if the artery be large, a ligature must be applied.

LACERATED ARTERIES.

These bleed comparatively little.

Cases.—A sailor, on board a Margate Packet, was bringing up his vessel in the river, and having his leg in a coil of the cable, the anchor was unexpectedly let go, when the cable caught his thigh, and tore off his leg six inches above the knee, excepting that a small portion of skin on the outer part still connected the parts ; the bone was broken ; the artery, vein, sciatic nerve, and muscles, were all completely separated. A handkerchief was bound around the wound, and he was brought to Guy's Hospital. The artery had ceased to bleed, but he had lost a considerable quantity of blood. I amputated his limb, and he proceeded favourably for ten days, when he was seized with tetanus, and died.

I have also seen the foot torn off above the ankle, and the bleeding stop without the aid of tourniquet or ligature.

Cheselden's Case—The case, related by Cheselden, of the arm being torn off at the shoulder without much hæmorrhage, is known to every surgeon.

Causes which prevent Bleeding.—There are two causes which operate to prevent bleeding :—

1. The cellular tissue is sometimes drawn over the mouth of the vessel, and makes a ligature upon it, which stops the blood.

2. Another state of the artery produces the same result, and in which the mouth of the vessel remains open, the coats of the artery are excessively elongated, and its sides fall together so as to render its canals impermeable.

Treatment.—The best treatment is to apply ligatures upon lacerated arteries, if they be large ; otherwise, when the powers of circulation are restored, there is a danger of hæmorrhage.

OF PUNCTURED ARTERIES.

Consequences.—They produce different symptoms from the other wounds of arteries in this respect, that the external opening being small, the blood does not readily escape ; and therefore coagulates in the cellular tissue, and forms a swelling there, which gradually increases in size as the blood issues from the wound in the artery ; the impetus of the blood causes a pulsation ; and the cellular membrane, around the extravasated blood, being condensed, forms a sac, which impedes the evolution of the swelling. The external wound heals, and thus an aneurism is formed.

It may be said that it differs from an aneurismal swelling in the

mode of its production ; and this is true, but it still has the other characters of the disease, and requires the same treatment.

Puncture in Bleeding.—I have several times known it happen from bleeding in the arm ; in one case the radial artery was wounded, but in all the other cases, the brachial artery.

Case.—The first case was in a patient at Guy's Hospital ; a dresser of Mr. Lucas, senior, bled the man, and he came to me excessively alarmed, telling me what had happened, and that he had great difficulty in stopping the hæmorrhage, but had at last succeeded, by applying a very tight bandage. A short time afterwards the man came to Guy's, and showed his arm to Mr. Lucas, who seeing the aneurism, and hearing the cause, told the man that he must submit to an operation, which the patient refused. In walking home, he met an old acquaintance, to whom he told the circumstances ; this friend, who occasionally bled and drew teeth, said he would cure him, and inviting him into his shop, he put a lancet into the swelling, and finding blood impetuously escape, he as quickly escaped from his shop. The patient finding himself bleeding, fortunately put his hand upon the wound, and called for assistance. A bandage was bound tightly round his arm, and he went to St. Thomas's Hospital, where Mr. Cline operated upon him, when the radial artery, in consequence of a high division, was found to be the wounded vessel.

Cases.—One of the apprentices at Guy's Hospital had the misfortune to wound the brachial artery in bleeding ; he immediately perceived the nature of the mischief, but before he could arrest the bleeding, thirty-seven ounces were lost. He bound up the arm extremely tight, and when the bandage was removed a few days after, an aneurismal swelling appeared at the fore part of the elbow, for which an operation was performed, of tying the artery at the part, an operation which was attended with great difficulty, and the patient died.

I once assisted Mr. Chandler in performing the operation for brachial aneurism, produced by bleeding ; the sac was opened, and the orifices above and below were secured by ligatures, but still there was a free hæmorrhage, from an anastomosing vessel, which it was necessary to secure.

Treatment.—The treatment of this injury consists in the immediate binding up of the wound, and applying a tourniquet to the middle of the arm, which should press upon the artery, and upon the opposite side of the arm only, leaving the circulation by anastomosis as free as possible.

If Aneurism forms.—If an aneurism still follows this accident the tourniquet is to be continued, as described in the lecture on aneurism.

Operation.—Should the tumour still continue to increase after this has been fully tried, it will be proper to make an incision upon the brachial artery, about midway between the elbow and shoulder-joints, and place a ligature upon it, but upon no account cut down upon the wounded vessel at the elbow.

In one instance, after I had applied a ligature to the brachial artery,

I was surprised to find the thread completely separated on the fifth day ; but the ulcerative process was probably accelerated by the inflammation which existed previous to the application of the ligature. The patient recovered.

OF CONTUSED WOUNDS OF ARTERIES.

Danger of.—Gun-shot wounds and severe bruises sometimes destroy the vitality of a portion of artery. As it will afterwards slough, there is a remote danger in such a wound, which must be carefully guarded against. The slough will not separate until from eight to ten days or more, after the wound has been inflicted ; and then the patient, without precaution, may lose an immense quantity of blood, and sometimes be destroyed by the hæmorrhage.

The slough opens the vessel upon its side ; and, no retraction ensuing, the hæmorrhage is unrestrained by the coagulation of the blood.

Treatment.—In these cases, it is required that the patient should be kept at rest until the sloughing process be completed ; and he must be instructed in the tightening of a tourniquet, which must be applied, and left constantly upon the limb, until all the sloughing has ceased.

Case.—A gentleman received a shot through the calf of his leg, and was proceeding so well as to be suffered to sit up, and to put his limb to the floor ; on the seventh day he was seized with a severe bleeding, from the effects of which he sunk.

ON THE TREATMENT OF WOUNDS OF PARTICULAR ARTERIES.

Arteries of the Scalp.

Wounds of these arteries require in their treatment,—first, a complete division of the injured vessel ; second, the application of pressure ;—by the first, retraction is permitted, and future bleeding is prevented ; by the second, the present hæmorrhage is suppressed.

Case.—I was called on one night to see the son of Dr. Johnson, who was bleeding freely from the temporal artery, which had been opened by a leech. I did not like to make an incision, but advised the application of a small tourniquet, which completely succeeded, and this instrument I should advise in all wounds of the arteries of the scalp, as the means of pressure.

Of Aneurism.—In aneurism, from wounds of the arteries of the scalp, I have, in each case that I have operated upon, been obliged to open the aneurismal sac, and to tie each communicating artery.

The aneurisms which I have seen on the scalp from injury, have been in the temporal and posterior aural arteries, and have arisen from wounds and contusions.

CAROTID ARTERY.

Speedily fatal.—The wounds of this artery are usually so speedily fatal, that surgery is rarely able to preserve life.

Securing the Artery.—In tying the artery the *pars vaga* must be excluded from the thread, and although the dissection of parts from the artery cannot be made at the moment of securing the ligature, yet when the hæmorrhage is stopped, a fresh ligature may be placed upon the artery alone, instead of depending upon that which has been of necessity employed at first.

SUBCLAVIAN ARTERY.

Torn.—I have never seen this artery wounded, but I have seen it torn through.

Case.—A man was brought into Guy's Hospital with a fracture of the clavicle, in which accident the shoulder was very forcibly drawn back to the spine. The dresser had to bleed this man in the injured arm, but little blood could be drawn; and, thinking that he had not passed the lancet sufficiently deep, he plunged it so far as to wound the brachial artery. The blood which issued from the wound was of a venous character, but it required a very tight bandage to stop the hæmorrhage. Great tumefaction succeeded about the shoulder, gangrene began in the arm, great constitutional irritation followed, and the man died. Upon examination of the body after death, it was found that after the fracture of the clavicle, the scapula was forcibly drawn back, so that the subclavian artery was torn through, but a cord of cellular membrane united its ends, so that the extravasation of blood had been very slight.

AXILLARY.

Mr. Key's Case.—Mr. Key operated, and tied the subclavian artery, on account of an aneurism of the axillary artery which had been produced by a forcible extension of a dislocated os humeri.

BRACHIAL ARTERY.

Wounded in Bleeding.—This artery I have often known wounded in bleeding.

Treatment.—A slight bandage, and a thick dossil of lint as a compress, have succeeded in healing the artery.

When an Aneurism forms.—If aneurism forms, the tourniquet should be employed, as I have described; and if this does not succeed,

apply a ligature upon the brachial artery. Make an incision in the middle of the arm, on the inner side of the biceps, and take care to exclude the vein and median nerve from the ligature.

ULNA ARTERY.

The wounds of this artery are usually at the lower part of the forearm, where the vessel is situated, between the tendons of the flexor carpi ulnaris, and the flexor profundus ; it is accompanied by the cubital nerve, which is placed close to the artery, and which must be carefully excluded from the ligatures. On account of the free anastomosis between this artery and the radial, the application of two ligatures, one above, and another below the opening into the vessel, is absolutely necessary to effectually stop the hæmorrhage.

RADIAL ARTERY.

This artery is much more frequently wounded than the ulna, being in every respect more exposed. The application of two ligatures is equally necessary, as in the ulna, and for the same reason. This vessel is readily found on the outer side of the flexor carpi radialis, and it is not accompanied by any nerve of magnitude.

OF THE PALMAR ARTERIES.

Frequently Wounded.—Wounds of the palmar vessels are very frequent, but generally the bleeding may be stopped by steady and continued pressure, by means of a compress and bandage, and by a tourniquet on the brachial artery ; the application of cold, and attention to position will materially assist. Should these means fail to arrest the bleeding, and if the openings of the divided vessel cannot be easily found, it will be necessary to secure the ulna, or radial arteries, or both : as from the very free communication of these vessels, the securing of one only, will not, in many instances, prevent further bleeding. It will be best, however, in wounds of the superficial palmar arch, under such circumstances, first to put a ligature upon the ulna artery, and then try pressure again, before the radial is taken up ; which should not be done unless a troublesome hæmorrhage continues. On the contrary, should the deep palmar arch be the seat of injury, and it become necessary to secure an artery, the radial should be first tied, and afterwards, provided the bleeding does not stop, the ulna should be likewise secured.

OF THE FEMORAL ARTERY.

High up in the Groin.—If this artery be wounded high up in the groin, the finger must be thrust into the wound to stop the bleeding, until a compress can be applied upon the pubes, and the vessel be secured.

In the Middle of the Thigh.—If it be wounded in the middle of the thigh, in the mode which I have described in the case of a relation of Mr. Saumarez, a large swelling will immediately form, and the artery will be deeply situated, under a large coagulum. A free incision must be made to give the surgeon ample room to proceed in securing the wounded vessel, a tourniquet being first applied. The direction of the incision will be that required in the operation for popliteal aneurism, only it must be more extensive. The coagulum, which is then exposed, must be scooped out from the wound by the fingers, and the parts be cleanly sponged. The tourniquet is then to be loosened, and the aperture in the vessel will be directly seen, when the tourniquet is to be again tightened, and two ligatures are to be placed in the artery, one above, and the other below the wound, an end of each thread being cut off; the edges of the wound are to be approximated, so as to favour the union by adhesion.

It is always right in these cases to divide the artery, between the ligatures.

OF THE POPLITEAL ARTERY.

Rarely wounded.—This vessel is so protected by the condyles of the os femoris, and so concealed behind the bone, that it is rarely lacerated, and when it is so, the wound must be highly dangerous, as it will be probably complicated with a division of the sciatic nerve.

It was a case of this accident which first attracted my attentinn to surgery, and which taught me its value.

Case.—A foster brother of mine, named John Love, aged about thirteen years, was playing and fell, as a wagon was passing, and one of the wheels of the wagon went over the back of his knee, as he laid with his face to the ground. The wagon was stopped, and when he was drawn from under it, a stream of blood directly burst from his ham; a handkerchief was tied tightly over the wound, and he was put upon the wagon, and was carried home in a fainting state. Different surgeons in the neighbourhood was sent for; but when they heard the nature of the case they all made excuses; one had a most dangerous case of fever, another was at a labour; a third with a pressing case of inflammation of the bowels; they were all engaged, and could not come, or, like the hare and many friends,—

“The first, the stately bull implored,
And thus replied the mighty lord;—

Since every beast alive can tell,
That I sincerely wish you well ;
I may without offence pretend,
To take the freedom of a friend.
Love calls me hence," &c.

Tired of waiting, an old woman (who was deemed a sorceress in the village) was applied to, and she sent back the messenger, saying that the bleeding would be stopped by the time they returned ; and so it was, for John Love had expired.*

This scene made a strong impression upon my mind, as it was the first death I had witnessed, and I was directly convinced how valuable a member of society a well-informed surgeon must be, and how great a curse an ignorant surgeon was. If the artery could not have been tied, the limb might have been amputated.

Danger in tying the Artery.—In tying the artery in the ham, there is some danger of including the sciatic nerve, as it is placed above the artery in cutting into the ham, and it must be carefully avoided ; the artery must be drawn from the vein where the large nerve is placed upon it. Mr. Cline once saw the nerve included in a ligature in the operation for popliteal aneurism, and the patient died in a few hours.

OF THE POSTERIOR TIBIAL ARTERY.

Rare at the Upper Part.—These injuries at the upper part of the leg are very unfrequent, but they do sometimes occur.

Case.—A man was brought into Guy's Hospital, who had fallen from a considerable height, upon a cart, and an iron peg in the cart had passed through the calf of his leg, between the tibia and fibula ; a profuse hæmorrhage ensued, but by the application of a tourniquet it was stopped. In six days the bleeding recurred, when the tourniquet was tightened, and the flow of blood was again suppressed : but in two days hæmorrhage again took place. I tied the femoral artery at the usual place, and for a week the man went on well, but then the bleeding was renewed, and I was obliged to amputate the limb. On examining it after removal, it was found that the iron had passed through the posterior tibial artery, at the origin of the anterior tibial, and had penetrated between the tibia and fibula.

Immediate Amputation.—An immediate amputation would be the best course to pursue.

In compound Fracture.—I have several times known the posterior tibial artery wounded by the bone in compound fracture ; once, in a patient of Mr. Chandler, and a piece of lint was forced into the wound, which stopped the bleeding, but it was followed by gangrene, of which the patient died.

* This was forty-three years ago, when a man who had recovered from the operation for popliteal aneurism, was deemed a sufficient curiosity to be annually shown to the students at our Hospitals.

Cases.—In a case of Mr. Lucas's in Guy's Hospital, Mr. Pollard, his dresser, secured the artery, and the patient did well.

A patient of Mr. Key's, a boy, upon whom a tourniquet was applied, had the bleeding restrained, and did not return.

In a patient of Mr. Travers's, it was wounded by a scythe, and was tied by Mr. Travers, in the Theatre at St. Thomas's Hospital; the patient did well.

It is sometimes wounded by the employment of the adze. I was called to a case at Hunton Bridge, Herts, by Mr. Wingfield, surgeon, at Market Street. The wound was small, and the artery cut, but not divided; the injury had happened three weeks before I saw the man, the bleedings had been very frequent, and were restrained for a time by pressure on the wound, by means of a tourniquet.

As the man had become excessively reduced by the last hæmorrhage, and could not have survived another, as soon as I was called in I tied the artery; just as I had secured the vessel, the man fainted, and I thought he would have died, but he ultimately recovered.

Treatment.—In wounds of this artery at the upper part of the limb, I should first apply a tourniquet, then place the limb in a bent position, so as to relax the gastrocnemius muscle, which I should raise from its attachment to the tibia, so as to expose the artery and its accompanying nerve, which I should be careful to exclude, whilst I put two ligatures upon the wounded vessel, and afterwards should carefully close the wound and unite by adhesion.

At the lower part.—At the lower part of the limb the artery is easily found, and secured behind the malleolus internus. It is accompanied by the posterior tibial nerve, which lies on its fibular side, and which must be avoided.

Interosseal Artery.—A wound of the interosseal artery I have never seen; but in the case of such a wound I should cut upon the vessel from the outer part of the leg, and seek it between the tibia and fibula, close to the fibula.

OF THE ANTERIOR TIBIAL.

Protected above.—This vessel is rarely wounded at the upper part of the limb, but frequently at the lower. Lying between the two bones above, it is much protected.

How secured.—When wounded at the upper part of the limb, an incision must be made on the outer side of the tibialis anticus to find it: a tenaculum, or a pair of forceps, must be employed to raise the wounded artery, to remove it from the interosseous ligament; and then two ligatures are to be applied upon it.

In Compound Fracture.—I have seen it wounded in compound fracture. First, in a brewer's servant, a patient of Mr. Birch's in St. Thomas's Hospital; the artery being tied, the compound fracture proceeded quite favourably.

Case.—In a second case the result was singular. A man was brought into Guy's Hospital, with a compound fracture of the leg. A few days after his admission he had a free hæmorrhage from the wound, which was stopped by the application of the tourniquet: but at different intervals the bleeding was frequently renewed, and I was at length compelled to amputate his limb. Upon examining it afterwards, a spicula of bone was found penetrating the anterior tibial artery, and the opening into the vessel thus produced, had been enlarged by a process of ulceration, so as to give rise to the hæmorrhage.

Operation.—When the anterior tibial artery is wounded low down in the leg, it must, when it is tied, be completely raised from the tendons of the tibialis anticus, and extensor proprius pollicis, between which it is placed; both ends must be secured.

On the Dorsum of the Foot.—This artery is sometimes wounded on the upper part of the foot, where it is placed upon the navicular bone, and the middle cuneiform, by a knife or chisel being dropped upon the foot.

Each extremity of the divided vessel must be carefully tied, otherwise the hæmorrhage will continue, on account of the free anastomosis of this artery with the plantar.

OF THE PLANTAR ARTERIES.

Treatment.—For a wound of either of these arteries, I should first try what the application of a bandage, with a compress upon the wound, and a tourniquet upon the thigh would effect, and should tie the posterior tibial artery, after an extended and unsuccessful trial of these means; for so deeply is the artery placed, and so situated amongst tendinous parts and nerves, that incisions should not be made at the wounded part.

STYPTICS.

Wool.—In bleeding from small vessels on wounded surfaces, very fine wool laid down and confined by bandage upon the part is one of the best styptics. The wool may be dipped in flour to add to its efficacy.

Turpentine.—Turpentine is said to have power as a styptic, and I have seen bleedings stopped by it when it has been applied by lint, and with pressure; but merely poured upon the wounded surface it appears to me to be quite powerless.

An Old Prescription.—There is an old prescription for a styptic in St. Thomas's Hospital, which I have seen useful.

R. Pulv: Catechu.

Pulv: Bol: Armen: aa ℥ij.

Alum: ust: ℥j.

Tinct: opii. q. s. ut fiat pasta.

This will stop the troublesome bleeding from leech bites.

LECTURE XXXIX.

ON WOUNDS OF VEINS.

Travers's Paper.—MR. TRAVERS has published a very good paper upon the mode in which they heal.

In Healthy Persons not Dangerous.—In a healthy constitution they are little dangerous, as the cellular tissue adheres over the apertures which have been made in them, and inflammation speedily closes them.

Case.—I once saw the axillary vein wounded in removing a scirrhus gland from the axilla; a dossil of lint was placed in the wound, and the arm was confined to the side, when no bleeding of consequence ensued.

In Unhealthy Persons Dangerous.—In unhealthy constitutions they inflame and suppurate; they also ulcerate, and sometimes life is destroyed, by bleeding, or by the inflammation extending to the large vein, and to the heart.

Several cases of this kind I have witnessed; and in the greater number the wound of the vein had been made to abstract blood for inflammation of the lungs; and I have thought that the inflammation of the vein was the result of the impediment to the pulmonary circulation.

Symptoms of Inflammation.—The patient in a few hours after the bleeding, complains of tenderness in the arm, and requests to have the bandage loosened; he next finds great pain in extending the limb; the wound looks red, and its lips are separated. Then the plexus of veins on the fore arm become swollen, hard, and very painful; afterwards the basilic vein of the upper arm feels as a solid body, and is much enlarged. High constitutional fever ensues. If the patient has sufficient power of constitution, abscesses form in the veins of the fore arm; and by opening these early, great relief is afforded; but if the habit be particularly feeble, the matter which is produced by the suppurative inflammation, does not point, but it remains in the veins, producing excessive constitutional irritation, which destroys life.

Appearances.—Upon inspecting the vein after death, it is found partly filled by adhesive matter, and in part by pus. There is in the collection at St. Thomas's Hospital, a beautiful specimen of abscess in the longitudinal sinus of the dura mater. I have seen the jugular vein inflamed and adherent throughout the greater part of its course.

Specimen.—We have, in the collection at Guy's Hospital, the femoral and iliac veins obliterated, taken from a patient who had phlegmasia dolens; which disease has been extremely well described by Dr. Davis, in the "Medico Chirurgical Transactions."

Division of the Saphena.—But the worst cases of inflammation of veins which I have seen, have arisen from the application of ligatures to the vena saphena.

Consequences.—First, I have seen a disease like phlegmasia dolens follow the division of this vein.

Secondly, numerous abscesses form and break, sometimes destroying life, at others producing excessive irritative fever, from which the patient has been with difficulty recovered. One patient became insane during the irritation, and did not afterwards recover her mental faculties.

Thirdly, they have died from suppurative inflammation, without any abscess appearing, and this is the cause of death after the operation of amputation, when it is performed during a very unhealthy state of the constitution. I have seen, under these circumstances, both artery and vein, in a stump, in a state of partial adhesion and suppuration.

I saw, in Paris, in 1792, a case in which life was destroyed by supuration of the femoral vein, after a gun-shot wound.

OF THE TREATMENT OF WOUNDS OF VEINS.

Position.—The first and greatest object is to empty the veins as much as possible, by the position of the limb, which should be such as to allow of the gravitation of the blood to the heart. In the arm, an inclined plane; in the leg, the position for a fractured tibia. This prevents accumulation of blood, and distention of the vessels.

Gentle Pressure.—Secondly, a roller, from the extreme part of the limb, to the wound, wetted with the liquor plumbi subacetatis, and spirit, should be applied to approximate the sides of the vein, and to make gentle pressure.

Thirdly.—Leeches should be freely applied, and if suppuration be produced, fomentations.

WOUNDS OF THE ABDOMEN.

Two Kinds.—These injuries are of two kinds: 1. Those in which the cavity is opened, but the viscera are not wounded. 2. Those in which some of the viscera suffer.

First Kind, often recovered from.—With respect to the first of these it is scarcely necessary to say, in the present state of surgical knowledge, that very extensive wounds of this description are often recovered from, as is proved by the operations for umbilical or ventral herniæ, by the Cesarian section; and, recently, by the removal of enlarged ovaria.* But the most curious circumstance in these wounds, is the manner in which the intestines glide away from the sharpest instruments, and escape injury. I shall relate two cases:—

* See cases by Mr. Liston.

Case.—In the year 1785, my second year of being at the Hospital, a gentleman came almost breathless to the hospital; and finding me the only person there, requested that I would immediately accompany him. He took me to a house in the Borough; and, leading me up stairs, showed me into a room, where I found a female in her shift only, lying upon the floor, weltering in her blood. I with difficulty raised her, and placed her upon the bed she had just quitted. On examining her, I found four wounds in her throat; one of which was deep and extensive. These I closed by sutures; after which she was able to speak; and I then asked her what had induced her to commit the act; she made an incoherent reply; but repeated the word stomach two or three times, which induced me to raise her linen, when I was surprised to find her bowels exposed by a wound reaching nearly from the pubes to the ensiform cartilage of the sternum; for after cutting her throat with a razor, she had ripped up her belly with it, and let out her bowels, but the intestines were still distended with air; and I had a difficulty in returning them into the abdomen. They had not received the smallest wound. Dr. Key now came into the room, and I proceeded to sew up this extensive opening; but she died in nine hours.

Mr. Tolman and myself were sent for to see a gentleman who had stabbed himself in several parts of his abdomen, with an old rusty dirk, and had for some time afterwards concealed himself from his family. When found, it was discovered, that a portion of omentum protruded through one of the openings; this was carefully returned; but, notwithstanding, the dirk still possessed its point, the intestines were not injured, and he recovered without a bad symptom.

The free motions of the intestines upon each other, independent of the peristaltic motion, is a great preservative in wounds of, and blows upon the abdomen.

Peculiar Symptoms.—There is another curious circumstance in wounds into the abdomen; which is that they immediately produce universal coldness and paleness, with nausea and faintness, excepting in the operation for strangulated hernia; in which case the intestine has been accustomed to violence.

Treatment.—In the treatment of these wounds, it is best to make interrupted sutures; the needle should penetrate the skin and muscles, but not the peritoneum. If the muscle be not included in the ligature, a hernia is sure afterwards to form; and, if the thread is introduced through the peritoneum, it adds much to the danger of abdominal inflammation.

Between the sutures, strips of plaster, or of lint dipped in blood, should be applied, and the patient should be freely bled from the arm. If the local inflammation be great, leeches should be employed; purgatives must be avoided, and food must not be given for several days.

OF THE SECOND KIND OF WOUND OF THE ABDOMEN.

Rare.—Wounds of the abdomen, extending to the stomach, or intestines, are extremely rare.

Dangerous.—There, danger is much lessened, if the wounded portion of the viscus protrudes through the opening in the parietes; for, if not, they are generally fatal.

WOUNDS OF THE STOMACH.

The best case which I have heard of, is related by Mr. Scott, in the medical communications, from which the following account is taken:—

Mr. Scott's Case.—"During the election for Weymouth, in March, 1784, Charles Thomas, a seaman, aged twenty-five, of a strong and healthy constitution, had the misfortune to receive a thrust with a small sword on the left side of his body. The sword passed in between the second and third of the lower false ribs, and penetrated into the cavity of the abdomen in a horizontal direction, to the extent of more than five inches, as appeared afterwards by the mark upon the blade.

"I saw him about half an hour after the accident. His whole appearance was then much altered; his countenance being quite collapsed, and covered with a cold sweat, while the pulse at his wrist was scarcely perceptible; he had also a constant hiccough, a frequent retching and vomiting of blood, and a considerable discharge of blood, and other fluids, from the external wound.

"From the place and manner in which the sword had entered, and the symptoms that followed, I was led to conjecture that the stomach was wounded; and that this was certainly the case, I was soon convinced, on examining the fluid discharged by the external wound, and finding in it several small pieces of meat in a soft digested state, together with some particles of barley.

"He had complained of thirst, and some barley-water had been given him to drink; but this had been immediately thrown up after passing the œsophagus. Other mild fluids were now tried, as were likewise a common saline draught, in an effervescent state, and some thebaic tincture, but with no better effect; and they were all instantly rejected, tinged with blood.

"The retching and action of the stomach continuing to be very violent, and the patient complaining, at the same time, of a lump, or dead weight, as he termed it, in his inside, he was desired to drink some warm water; this was soon thrown up, accompanied with a good deal of barley in solid grains, with the surface slightly broken, and some pieces of meat in a half digested state. More water being given him, it was quickly returned, tinged with blood, but, otherwise, nearly as pure as when swallowed.

"I now proposed that we should avoid giving anything further by

the mouth ; but, as the spasms and hiccough were still very frequent, an emollient clyster was administered, by which a considerable quantity of fæces was discharged. Soon after this, another clyster, containing twelve ounces of barley-water, and ʒij. of thebaic tincture, was thrown up, and the greater part of it retained. Warm fomentations were likewise applied externally ; the surface of the wound was loosely dressed ; and he was desired to lie as much as possible upon the injured side, with a view to favour the discharge.

“On the first of April, the day after the accident, the symptoms were still very unfavourable. His pulse continued low and languid, with a great prostration of strength, and a coldness of the extremities. He had several rigors towards morning, and the spasms were sometimes very violent. He complained of extreme coldness over his whole body, and of a constant gnawing pain about the pit of his stomach, to which part warm fomentations were frequently applied.

“A laxative clyster was again administered, which was followed by a copious discharge ; soon after this, another clyster, consisting of fourteen ounces of veal broth, and two drachms of thebaic tincture, was thrown up and retained. A similar clyster was repeated in about four hours, with the same effect. Flannels, dipped in warm milk and water, were occasionally applied to his arms and legs, and hot bricks to the soles of his feet. He made a little water twice in the course of twenty-four hours ; this was highly coloured, and deposited no sediment, though kept for a considerable time.

“April 2. He had passed a restless night, and now complained of intense thirst. The hiccough and spasms were less frequent, but he suffered much from a constant burning pain in the lower part of his stomach. His pulse was small, and beat about 120 in a minute. The fomentations were applied as usual ; and ʒvj of the sal: cathart: amar: were dissolved in some broth, and thrown up into the bowels as a laxative. This produced a considerable discharge of soft slimy fæces, in which were several small pieces of clotted blood enveloped in mucus. After this, in the course of the day, three clysters of broth and thebaic tincture were thrown up and retained. He was desired to use the pulp of an orange occasionally, to allay his thirst, and to wash his mouth frequently with barley-water acidulated with lemon juice.

“April 3. I was called to him early in the morning, and told he was at the point of death. A clergyman had been sent for at the same time to perform the last offices. The nurse informed me, that, whilst supported in bed to wash his mouth, he had been seized with a violent retching, accompanied with convulsions of the chest, but that nothing had been discharged from his stomach, except a small quantity of bloody fluid. When I saw him, the spasms still continued ; his forehead and breast were covered with a cold sweat ; his pulse was low, and intermitted ; so that it could only be felt at intervals ; and his strength seemed to be quite exhausted. Warm fomentations were immediately applied to the region of the stomach ; and, as there was always some of the veal broth kept in readiness, I threw up about fourteen ounces of it,

with ζij of the thebaic tincture. The violence of the symptoms was soon moderated, and he appeared very languid, and showed a disposition to sleep.

"When I saw him about four hours afterwards, I was told that he had enjoyed some rest. His pulse was now regular, but small and quick; he was very weak, and just able to inform me, that, in washing his mouth, he had accidentally swallowed some of the liquor, and that this had thrown his stomach into violent action. About one pint of the broth was now injected without any addition. This was likewise retained, and repeated at intervals of five or six hours. He now made water frequently, which, upon standing, deposited a considerable quantity of sediment, of a light brick, or straw colour.

"April 4. The hiccough, retching, and other unfavourable symptoms, were now entirely gone; but he still complained of a fixed pain in his stomach, accompanied with a sensation of heat, and of a soreness of the injured side, extending from the wound toward the middle of the abdomen. He was likewise troubled with thirst; his pulse was small, and about 110. The external wound had now begun to yield a discharge of good matter.

"The same mode of treatment was continued, and the symptoms became daily more favourable. The broth was administered in clysters, to the amount of two quarts, or five pints a day. The fomentations were continued externally, and his feet and hands were frequently bathed in warm milk and water. He voided his urine regularly, and in about the proportion of three pints in the twenty-four hours, though it sometimes considerably exceeded this quantity, and continued to deposit a great deal of sediment. A little of the sal: cathart: amar: was occasionally added to the clysters in order to stimulate and cleanse the intestines; after the fourth day, however, there was scarcely any feculent matter discharged, but only a small quantity of viscid bile.

"On the 10th day from the time of his being wounded, he appeared to be very sensibly relieved; his thirst and febrile symptoms were much abated, and his pulse was regular, and about ninety. As he was in good spirits, and expressed a wish that he might be allowed to swallow something, I procured some calf's-foot jelly, made luke-warm, of which he ate half a pint, without feeling any bad consequences. The only remarkable circumstance that attended the first time of his swallowing, was, that it occasioned frequent eructations, and a great discharge of air; but this, according to his own account, produced rather a grateful sensation than otherwise. Next day he was allowed some new milk for breakfast, and some chicken broth for dinner. The nutritious clysters were continued, however, till the 16th day, though less frequent than before. From that period, for about a fortnight, he lived wholly on bread and milk, and light broth. He was then allowed chicken, veal, and other meats easy of digestion. The external wound had been healed for some time, and he recovered his strength very gradually. The only inconvenience he suffered was from costiveness, and a sense of soreness and stricture which extended

from the external wound towards the middle of the abdomen. This was particularly felt after a violent expiration, or any sudden extension of the body, when, to use his own expression, his side was drawn inwards and upwards. The costiveness was obviated by mild laxatives, and gently stimulating clysters, and went off entirely as the intestines recovered their true and natural action. The other complaint which I apprehend to have originated from an adhesion of the inflamed stomach, to the peritoneum, seemed to go off gradually as he recovered his strength; though it was still felt in a certain degree in stooping, walking quick, or any great exertion of the body. When I last heard of him, two months ago, he enjoyed good health.”*

“This case affords a striking instance of the resources and peculiar powers with which nature has endowed the animal machine, for its preservation, and for remedying any injury it may sustain. The treatment was such as was necessarily suggested by the symptoms. The wounded stomach was so extremely irritable, that even the mildest fluids increased the violence of its action, and were rejected; for had any substance, whether of medicine or aliment been admitted, it would probably have interrupted the union of the divided parts in the first instance, or afterwards, by the action necessary for its expulsion through the pylorus.

“The liquid contents of the stomach had been chiefly discharged by the external wound, though part of them must, no doubt, have passed into the cavity of the abdomen, and have been afterwards absorbed; but the wound of the stomach collapsing, the barley and undigested meat were left, which increased the irritation, and occasioned the uneasiness and sense of weight he complained of, and which was, in a great measure, removed by the vomiting that took place upon his drinking the warm water.

“He felt some relief after the retention of the first clyster, but at that time his strength was so reduced, and the symptoms were altogether so unfavourable, that neither himself, nor those who saw him, entertained any hopes of his recovery. It is indeed surprising what an extreme debility took place immediately after the accident, which could only arise from the nervous influence and general sympathy with a part so essential to life.

“The accident that happened on the fourth day, induced me to persevere in the mode of treatment we had adopted. Indeed there was great encouragement to continue it, as the broth clysters were not only retained, but there was proof of an absorption having taken place, by the secretion and evacuation of urine, which then began to be considerable. It is a generally received opinion, that clysters seldom pass beyond the valve of the colon: the contrary has indeed been observed in the volvulus or iliac passion, but in that case the natural action of the intestines is inverted, and a violent degree of anti-peristaltic

* This was in the September twelve months following, as the paper is dated November 15, 1785.

motion prevails ; in this case, however, the broth was thrown up in a very gradual manner ; and though, perhaps, it did not pass the valve of the colon, in the first instance, I am inclined to believe, from the sudden manner in which the absorption was afterwards carried on, that a gentle degree of anti-peristaltic motion took place, whereby it (the broth) was impelled to the smaller intestines ; this will appear less surprising, when we consider, that, in the natural action, the first impulse is communicated by the stomach, in discharging the digested aliment at the pylorus, and continued through the intestines in determining the feculent matter downwards : but here the natural action was suspended, the stomach was at rest, and there was no foreign matter to be discharged.

“ The advantages to be derived from throwing up a supply of fluid, and supporting nature in this manner, in particular cases of morbid affections of the digestive organs, will readily occur to the attentive practitioner.”

WOUNDS OF THE INTESTINES.

In Operating for Herniæ.—In a small wound of the intestine, which I witnessed in strangulated hernia, under the operation, I pinched up the opening with a pair of forceps, and tied a thread around it ; I then passed up the intestine to the mouth of the hernial sac, leaving the ligature to hang from the wound, and the patient recovered, but he had severe symptoms for several days.

Large Wounds.—In a more considerable wound of the intestine, I should make an uninterrupted suture, and return the intestine into the abdomen, letting the end of the ligature hang from the external wound, which I should otherwise close with great care. I well know, that in experiments on animals, the ligature has been cut off close to the intestine, which has been returned into the cavity of the abdomen, and the external wound has been afterwards closed, so as to leave the ligature to separate into the intestine. Now I do not clearly understand that this plan, in any way, adds to the patient's security ; but, on the contrary, it increases his danger in my opinion, if the process of adhesion be deficient.

Treatment.—In the treatment of these wounds, it is right, if the wound be in the small intestines, to keep the patient without food, and support him by clysters of broth, &c. If it be in the large intestines, after a few days, a little jelly may be allowed. Perfect quiet is to be observed ; and, if there be much tenderness of the abdomen, leeches should be applied.

Rupture of Intestine.—Ruptures of the intestines from blows are more frequent accidents, arising from kicks of horses, falling upon projecting bodies, &c. The symptoms are, great depression, coldness, and paleness ; the pulse is scarcely to be felt if the laceration be large, and the patient dies in from twelve to twenty-four hours after the accident, quite sensible to the last moment of his existence.

But if the laceration be small, the symptoms are less violent ; there is coldness, tension of the abdomen, vomiting, costiveness, and not the least disposition for food ; there is subsequently great abdominal tenderness and great enervation.

Case.—A patient was brought into Guy's Hospital, under the care of Mr. Forster ; the man had been working in a gravel-pit, when the gravel fell in upon him. He vomited, his abdomen became tense, and as he made scarcely any urine, the case had been thought to be retention of urine. The man died six days after the accident, and, on examination after death, a rupture was found in the intestines.

Treatment.—The treatment in these cases, is perfect rest, to prevent any disturbance of the adhesive process, to apply leeches and fomentations to the abdomen, to avoid giving any medicine, and to check the desire of friends in giving food for several days after the accident.

Sometimes recovered from.—The intestines thus remaining for a length of time at rest,* and inflammation being kept within the adhesive bounds, I have seen (what I believe to have been) cases of this injury recovered from.

WOUNDS OF THE LIVER.

Case.—I have seen deep stabs, with a pen-knife, in the situation of this organ, recovered from, after great inflammation in the abdomen. The patient was bled generally, and by leeches, and fomentations were employed. Adhesive plaster had been applied to the stabs, and on its being removed, a bloody serum was discharged from the wounds.

WOUND OF THE GALL BLADDER.

Case.—Mr. Edlin, of Uxbridge, informed me of the following case :—Two soldiers quarrelled, and one struck the other with his bayonet in the right side, just below the margin of the ribs. The wounded man directly fainted and fell ; when he recovered from his fainting state, he complained of agonizing pain in his abdomen, which became extremely tense and tender to the touch. In thirteen hours the man died ; and, on examination of the body, the gall bladder was found to have been penetrated by the bayonet, and bile was extravasated into the abdomen. Mr. Edlin said, that wherever the bile rested, the peritoneum was highly inflamed.

* The peristaltic motion is greater or less as the intestines are full or empty.

WOUNDS OF THE SPLEEN.

Although this organ may be removed from the body, without the destruction of life, as is known from the case of the soldier, mentioned by Dr. Gooch, and by numerous experiments on animals, yet a very small wound of it is sometimes destructive of life; the best example of which I shall give in the following case:—

Case.—A lieutenant of a press-gang was attempting to press a man, who resisted with much violence; a scuffle ensued, and the lieutenant struck the man with his dirk, which entered near the ensiform cartilage, and its blade was nearly buried in the body. The man was brought to St. Thomas's Hospital, pale and extremely depressed, his abdomen became tense, and he died. Upon examining his body, it was discovered that the dirk had passed from the ensiform cartilage, under the margin of the chest into the abdomen, on the left side, and that its point had penetrated the concave surface of the spleen; the cavity of the abdomen was filled with fluid blood.

Wounded in Tapping.—It is said, that the spleen has been often wounded by the trochar, when tapping was performed on the left side, which, under enlargement of this organ, might happen.

Ruptured.—I have several times known the spleen ruptured by carriages going over the abdomen, and once by the horn of an ox. Each of these cases proved fatal.

Cases.—Twice have I known the spleen torn from its natural attachment to the diaphragm. The first instance, was in a patient of Drs. Babington and Letsom, a Miss Harris, who, having vomited violently, discovered soon after a swelling at the groin, and at the lower part of the abdomen. I was asked if it was hernia, and I declared it was not. She died after a week, vomiting constantly the liquids which she swallowed. When the abdomen was opened after her death, the swelling was found to arise from the spleen, which had been detached from the diaphragm, and was enlarged by the interruption to the return of blood from the veins, although the artery still contained blood. The spleen was turned half round on the axis of its vessels.

The other case was that of a gentleman who was hunting in Surrey; he fell from his horse when going at full speed. He died the following day, or the day after. Dr. Pitt, who attended him, examined the body after death, and found the spleen torn from the diaphragm.

Treatment.—In wounds or ruptures of the spleen, I believe nothing can be done. If the case could be accurately ascertained, pressure by a roller on the abdomen would be the best treatment.

WOUNDS OF THE KIDNEY.

A wound of this organ is not fatal.

Case.—A boy called at my house, and showed me some chalky con-

cretions which he had coughed up from his lungs or bronchial glands. I said, "How long have you been subject to this complaint?" He answered, "Ever since I have passed blood with my urine." I asked him to explain himself further, when he told me, that when quarrelling with another boy, he had been struck with a penknife in his back; that almost immediately he wished to make water, when he passed a large quantity of blood. This continued for several days, but subsided by his remaining quiet in bed. The recumbent posture is in such a case the very best security.

WOUNDS OF THE BLADDER.

Danger from State of Bladder.—These are dangerous, or not, as the bladder is full or empty, when the injury is inflicted. If full, urine is extravasated into the abdomen, or extensively into the cellular tissue, and death ensues. If empty, or nearly so, the danger is greatly lessened.

The bladder is sometimes ruptured when the above observations are applicable. The cause of its laceration is generally a fracture of the pubes.

Treatment.—The treatment of these cases, consists in leaving a catheter in the bladder, and enjoining perfect rest.

WOUNDS OF THE CHEST.

Of Two Kinds.—These are also of two kinds :—First, Wounds of the parietes. Second, Wounds of the viscera.

Of Parietes.—Wounds of the parietes are not attended with much danger.

Cases.—A boy fell from a tree upon some pales, which entered his chest between the seventh and eighth ribs, tearing his intercostal muscles freely. The air rushed violently into his chest at each respiration, and was again expelled, when the anterior surface of the lungs appeared at the wound. The edges of the wound were brought together by adhesive plaster, a roller was applied tightly round the chest to confine the motion of the ribs, and he was bled very freely. He did extremely well.

A man was brought into St. Thomas's Hospital who had been stabbed between the cartilages of his ribs, he bled very profusely, and I thought the internal mammary artery was wounded, but the bleeding soon subsided, and he recovered.

Treatment in wounds of the parietes of the chest, is to promote as much as possible the adhesive inflammation to close the wound externally.

Hæmorrhage.—If there be bleeding from the intercostal artery, the finger should be pressed upon the orifice of the vessel, until the disposition to hæmorrhage ceases.

Case.—A man died in Guy's Hospital, who had been wounded through the intercostal muscles with an iron spindle, the wound healed, but tetanus supervened, of which he died. Upon inspecting the chest after death, the lung was found to have assisted in closing the wound, by adhering to the injured pleura.

OF WOUNDS OF THE LUNG.

Symptoms.—When this happens, the circumstance is known by the patients coughing up florid and frothy blood; by free bleeding from the wound, if sufficiently large to permit its escape; by considerable irritation and tickling in the larynx, and by dyspnœa.

Danger of.—Danger in three ways results from wounds of the lung. First. From hæmorrhage, if any large branch of the pulmonary artery is wounded. If the vessel be wounded by a sword or knife, it bleeds very freely; but, if by a broken rib, very little, as it has the nature of a lacerated wound.

Treatment.—In either case, the patient must be freely bled, to prevent the continuance of the hæmorrhage from the wounded lung, and the opening must not be closed in the parietes until all bleeding from the lungs have ceased, otherwise the blood will remain in the cavity of the chest, and produce irritation and inflammation.

Danger from Inflammation.—The second danger is from inflammation of the lung, and effusion into the cavity of the pleura.

The first is to be guarded against by large and repeated bleedings, determined by the dyspnœa and hardness of the pulse; but there is little danger of bleeding too much in one of these cases, as it is an object not only to diminish the force of the circulation, but the quantity of the blood in the pulmonary vessels.

If effusion follows, it is the result of neglected inflammation, or of having closed the external wound too early. In the one case, it is a purulent secretion; in the other, a bloody serum, which produces the dyspnœa some days after the accident.

Operation for Effusion.—For effusion into the chest, it is right to perform the operation for paracentesis of the thorax, to draw off the pus or bloody serum which has collected in the pleura. The mode of doing this has been already described.

Effusion in Old Persons.—In old persons, there is great danger in fractured ribs with wounded lung, and I always give a guarded opinion, for I have seen several die from effusion of fluid into the cellular tissue of the lung. The greatest care and quiet are therefore required in such a case, and it is better to give digitalis than to bleed very largely.

Emphysema, the third consequence of wounded lung, is less dangerous than the others. It sometimes extends to the face, covering the neck, and also a large part of the trunk.

Treatment.—In the treatment, a bandage is to be placed so tight

around the chest, as to prevent any rattling during a deep inspiration ; the patient is to lie on the wounded side, and punctures may be made into the cellular tissue, where it is much loaded, but not so large as the wound made in bleeding.

In all cases of wounds of the chest or lungs, rest is essentially necessary to recovery.

OF WOUNDS OF THE PERICARDIUM.

Case.—Mr. Saunders told me the following case, which occurred whilst he lived with Mr. Hills, of Barnstaple. Mr. Hills was called to attend a man, who, in a quarrel, had been wounded by another with a reaping hook through the cartilages of the ribs. The wound was small, but deep, and the man had the appearance of one who had sustained a dangerous injury. In two or three days after, he had much pain in the region of his heart, a quick and small pulse ; and in a few days more he began to swell, and could not lie down in bed. I forget exactly how long he lived, but I think for a fortnight or three weeks ; and after his death it was discovered that the hook had passed through the cartilages of the ribs into the pericardium, in which there was an effusion of bloody pus.

WOUNDS OF THE HEART.

These wounds rarely occur, but in their consequences are so immediately fatal, as to preclude the possibility of affording relief. Two cases, however, of much interest, I have known, and of one there is a preparation in the museum of St. Thomas's Hospital. I will relate them.

The first case is related in the second volume of the "Medico-Chirurgical Transactions," and was sent to me by Mr. Featherton, who attended the patient.

Case.—Richard Hollidge, a private in the Northampton regiment, while on duty on the 29th of March, 1810, with an unfixed bayonet in his hand, slipped down, and his bayonet entered his left side between the sixth and seventh ribs, upon the superior edge of the latter. He was some yards distant from the gate at which he was posted, and being challenged, he returned to open it with the bayonet still remaining in the wound ; he was incapable of withdrawing it himself, but the person coming in extracted it for him. I was called to him within five minutes of the accident ; he was then in a state of syncope, the extremities cold, and his pulse scarcely perceptible. In about the space of a quarter of an hour, he gradually revived, did not complain of any severe pain, and expressed, "that he believed he was more frightened than hurt." I examined the wound with much diligence, but could not trace its extent further than one inch and a quarter, though it was evident that

the bayonet had penetrated two inches : the hæmorrhage was very inconsiderable. His wound was dressed ; he was conveyed to the military hospital, and put to bed ; he was incapable of lying on his right side, but slept tolerably well. On visiting him the following morning, he complained of lancinating pains extending from the wounded part across the chest, and of severe fugitive pains in different parts of the abdomen ; his pulse was quick and thready, and tongue white and dry. These symptoms led to a suspicion, that the pleura costalis at least was wounded, though no opening could be ascertained extending into the cavity of the chest. Zxxvj . of blood were taken from his arm, a solution of sulphate of magnesia administered, and fomentations applied to the abdomen. He was obliged to be supported in bed nearly in a sitting posture, as respiration became much impeded when perfectly horizontal ; in this position he appeared to breathe with freedom. In the evening, he expressed himself in every respect much relieved ; his pulse was less quick, and had lost its thready sensation ; tongue more moist ; his medicine had operated moderately. On the following morning, I found he had passed a good night, his pulse was calm and steady, scarcely quicker than natural, and the tongue quite moist ; the lancinating pains had subsided, and he merely complained of a trifling pain in the wounded part ; this was increased by a slight cough, with which he became affected only this morning, and which was unattended by any expectoration. His aperient draught was repeated, an emulsion ordered for his cough, and the antiphlogistic regimen strictly adhered to. Throughout the day he was walking about the yard, in very good spirits, quite jocular in his conversation with his fellow patients, and expressed himself to them, that "low diet would not do for him any longer." He retired to rest about nine o'clock, and fell asleep ; at eleven, he got out of bed to the commode, had an evacuation, by no means costive ; said, "he felt himself chilly, and a sensation that he should die ;" returned to bed, and expired immediately ; forty-nine hours from his receiving the wound.

I examined the body on the following morning, in the presence of two other surgeons. On opening the chest, the pleura was found slightly inflamed for some distance round the puncture, and an effusion of adhesive matter, emitting a small portion of the lung to the wounded part ; the lung was not injured. At least two quarts of blood were effused into the cavity of the chest ; the pericardium was nearly filled with blood, and had a puncture through it, extending three quarters of an inch into the muscular substance of the left ventricle, about two inches from its apex. A small coagulum was formed at the edge of the wound through the pericardium.

Upon opening the left ventricle of the heart, it was discovered that the bayonet had penetrated the substance of the ventricle, and had cut one of the fleshy columns of the mitral valve.

On a review of the case I conceive it very curious, that an organ like the heart, possessing such excessive irritability, a point to which

the most interesting of our sympathies are referred, and which is in some degree influenced by the most trifling, should be so materially wounded, and yet the system take so little cognizance of the injury. Death, in this case, it was perfectly evident, was not produced from any alarm excited in the system by the wound, but occurred as a secondary consequence, from the hæmorrhage increasing to such an extent, as to interrupt the actions of the heart and lungs. That the hæmorrhage proceeded chiefly from the heart, must be admitted: there was no symptom whatever that indicated a wound of the lung; none could be found on the most deliberate examination; and the intercostal artery was entirely free from injury."

The second case has been published in the "Medical Records and Researches," from which the following particulars have been taken. It occurred during the time that Dr. Babington was employed as assistant surgeon at the Royal Hospital at Haslar, and by him the particulars were communicated:—

Case.—"Henry Thomas, a marine, was received into the hospital from his Majesty's ship *Foudroyant*, having a wound in his side. He had slipped from the gangway, where he had been placed as sentinel, to the deck below; and had fallen upon the point of his bayonet, which had penetrated his side a little below the false ribs, nearly in a perpendicular direction, as far as the hilt of the instrument. Immediately after the accident he drew out the bayonet without assistance, arose, took up his musket, walked eight or ten steps, and then dropped down in a fainting state; from this state he soon recovered, and was taken to the hospital about two hours after the receipt of the injury; he then complained of but little pain, was inclined to sleep, and when roused appeared in great distress. The wound was on the left side, about two inches above the ilium, and communicated with the cavity of the abdomen; but neither its direction nor depth could be ascertained. His body was cold, his pulse scarcely perceptible, but he had not apparently lost much blood. A portion of omentum, about 3ij in weight, protruded through the opening, this was cut off. A purgative enema was thrown up, which procured a motion, without any appearance of blood. He drank freely of coltsfoot tea, and took his medicines; the fluids produced nausea, and attempts to vomit, but he did not eject any thing from the stomach. The breathing was at first slow, but free, by degrees it became more oppressed, and at length grew extremely quick and laborious, attended with a sense of weight on the right side of the thorax, which threatened suffocation. The expectoration was not bloody. Soon after the injury he began to complain of a pain in the chest, and at the pit of the stomach, which gradually increased, and towards midnight became almost insufferable. The upper part of the thorax had swelled a little, and the motion of the right arm much increased his sufferings. This tumefaction gradually augmented, and at eleven o'clock had reached the head and face; it subsequently extended all over the body before his death, which

took place a little after two o'clock in the morning, apparently from strangulation. He retained his senses to the last minute.

"On examining the body twelve hours after death, the following appearances were discovered :—

"The triangular wound from the bayonet, was seated on the left side, midway between the spine and the linea alba, having the last rib and the crista of the ilium at equal distances above and below it, it readily admitted the point of the finger. A portion of omentum still protruded, and appeared gangrenous. The direction of the wound was obliquely upwards and inwards, and had penetrated the following parts :—the integument, abdominal muscles, peritoneum, the colon near its termination in the rectum, again at its arch ; the stomach inferiorly, two inches from the pylorus, and superiorly, under the left lobe of the liver, which was also wounded ; the diaphragm in the centre of the tendon ; after this the pericardium ; the right ventricle of the heart in two places, first the inferior part, and again near the tricuspid valve ; next the lungs were pierced ; and last the anterior parietes of the right side of the thorax, between the cartilages of the second and third ribs, terminating in the substance of the pectoral muscle. The abdomen contained a little bloody serum ; the pericardium a small quantity of blood ; but the right cavity of the pleura had about two quarts of blood within it.

"Although so many parts of importance were injured, but little was indicated of the extent of mischief from the symptoms which occurred during life. Thus the colon was twice perforated, but the stools were not tinged with blood, nor was their any feculent matter in the cavity of the peritoneum. The stomach was also twice wounded, and yet vomiting did not take place, excepting once slightly, as he was brought to the hospital. The liver was opened to the extent of one inch, but yielded scarcely any hæmorrhage. The heart had been pierced in two places, but yet its action continued regular, and supported circulation for above nine hours. The middle and upper lobes of the right lung were both wounded ; yet he did not cough up any blood. The emphysema had originated under the pectoral muscle, and had gradually extended over the whole body."

WOUNDS OF THE THROAT.

Parts Injured.—Attempts to commit the act of suicide are the usual causes of these injuries, and usually one of the following parts suffer :—The pharynx, the larynx, the trachea, or the œsophagus.

Description of Parts.—If the chin be a little elevated, its distance from the sternum is about nine inches. First. Three inches below is the thyroid cartilage, and the space has the muscles of the os hyoides and tongue on the fore part. Second. In the middle division is the larynx, with the pharynx behind it. Third. In the lower part is the trachea before, and the œsophagus behind. On the sides of these parts are situated the carotid arteries, which are divided near the os hyoides.

The internal jugular veins are also placed laterally. The pars vaga accompany the carotid arteries, and the grand sympathetic nerves are found somewhat nearer the vertebræ.

OF THE WOUND ABOVE THE LARYNX.

This is the most frequent seat of injury, which is inflicted whilst the chin is elevated.

Symptoms.—Through the wound, air and blood issue with frightful impetuosity, more especially when the patient coughs. A lighted candle brought near the aperture is immediately blown out, and liquids, when attempted to be swallowed, are violently ejected from the wound. Hence, those ignorant of the structure of the parts, suppose that the air-tube is injured, but the anatomist is aware that the wound has passed through the muscles of the jaw and tongue into the pharynx, being generally inflicted between the chin and os hyoides.

Arteries Wounded.—The arteries which bleed freely, are the sublingual, that press just above the os hyoides on each side to the tongue ; but sometimes the external carotid arteries are divided, when, from the rapid hæmorrhage, death is almost immediate.

TREATMENT.

The wound is generally in itself but little dangerous ; and when persons die shortly after its infliction, it is frequently from the fever which has led to the commission of the act, if it be not from hæmorrhage.

Position.—Position in this wound is to be carefully attended to. If the chin be elevated, the wound gapes widely ; but when the chin is depressed, the frightful aperture becomes closed ; the head should therefore be brought down towards the chest, and confined in that position, in order to prevent a separation of the edges of the wound.

Sutures.—I have generally put three sutures in the integument only, the more effectually to guard against any disturbance of the approximated edges, which may otherwise, from the constant motion of the patient during irritability or delirium, be produced. Such sutures, through the integument only, are in this respect very useful, and are not ever disadvantageous.

Enema.—The patient's mouth and tongue should be kept cool and moist, by the application of a portion of lemon dipped in water ; but he should be chiefly supported by clysters of broth and gruel, to which opium should be added if they quickly return ; and when the fever has subsided, the addition of port wine should be made.

I knew a lady who had a stricture in her œsophagus, who was supported forty-five days by clysters of broth and wine, when she could not swallow even a drop of water.

When food is given by the mouth a small quantity of solid matter

excites less irritation than fluid : and a small portion of jelly is the best.

The sutures should be removed in a week, and adhesive plaster be substituted for them.

When the wound is situated below the os hyoides, as it sometimes is, the epiglottis is injured at its junction with the thyroid cartilage.

In a case of this kind to which I was called at Walworth, I put a thread through the frænum, on the dorsum of the epiglottis, and fixed it again to the thyroid cartilage. The man recovered ; but whether it was a post hoc, or a propter hoc, God knows ! In general, these cases are fatal, in which the epiglottis is separated from the thyroid cartilage, from a want of defence to the air tube.

OF THE WOUND INTO THE LARYNX.

Symptoms.—This wound is either into the thyroid or crycoid cartilages, or into the ligament which unites them.

The air rushes out through the wound in expiration, and violently in coughing, and is also inspired through it. The person is not able to speak, unless the aperture be closed by pressure ; but the food does not pass out from it.

A wound confined to the cartilages of the larynx, or to the ligament uniting them, is not dangerous, and by far the greater number of these cases, which I have seen, have done well. The treatment of them consists in the approximation of the parts by position, and in the application of adhesive plaster to retain the edges in contact.

When the wound is inflicted with excessive violence, or by a stab, the pharynx may be wounded, as it is situated behind the larynx, and then the treatment of the wound is to be similar to that of the wound above the larynx.

Cases.—In a case of this nature, which was under the care of Dr. Ludlow, of Calne, he informed me that the thyroid cartilage, which was many weeks in healing, became ossified, and that portions of it exfoliated.

In a patient of mine in Guy's Hospital, the wound upon the thyroid cartilage remained fistulous, and I raised a piece of skin from the surface of the neck, above the opening, and turned it over the opening, the edges of which I had previously pared : it united extremely well.

OF THE WOUND BELOW THE LARYNX.

When the wound is inflicted within three inches of the sternum, it is more dangerous than in any other situation. The trachea is here on the fore part, the œsophagus behind, and the carotid arteries are situated close to the trachea, more especially the right. The thyroid gland crosses the upper part of the trachea, and its veins cover the fore part.

Symptoms.—If the trachea be cut, the air rushes through the wound both in expiration and inspiration. The blood gets into the trachea, and excites a violent coughing, by which a bloody froth is forcibly ejected, but the food or liquids do not pass out through the aperture.

The external opening, in these cases, is generally small as the wound often arises from a stab, and the consequence is, that the blood does not freely escape, but, lodging in the bronchia, adds excessively to the dyspnœa.

Treatment.—In the treatment, the first object is to stop the bleeding; and if the wound be not sufficiently large to lead to the easy discovery of the source of the hæmorrhage, an incision should be made, in a longitudinal direction, to expose the mouths of the vessels. If the trachea be widely opened, pass a needle and ligature through the cellular tissue, upon its surface, which, from its firmness, will support the ligature, and thus bring the edges of the aperture into contact; but do not penetrate the trachea itself with the needle. Thus securing the trachea, bring the edges of the external wound together by bending the head forwards; but do not apply adhesive plaster, as it prevents the escape of air and blood in coughing, produces additional difficulty of breathing, and occasions emphysema.

The ligature upon the cellular covering of the trachea, is to be separated by the ulcerative process, which will generally be effected in a week.

A transverse wound in the trachea, will be followed sometimes by a loss of voice, on account of the division of the recurrent nerves.

If one of the carotid arteries be opened, death is usually so instantaneous, that the patient cannot be saved. If a surgeon were present, or the wound was very small, and he could reach the patient before he expired, he should thrust his finger into the wound, to stop the flow of blood, and then cut down upon the vessel, to expose it sufficiently, to place a ligature upon it, which he can afterwards better adjust.*

When the trachea is deeply cut, the œsophagus is sometimes wounded; and, if the injury be extensive, death will generally ensue; but a stab into the œsophagus, or a small wound, may be recovered from.

After an injury of this kind, the wound into the trachea is to be treated as in the former instance, by which that in the œsophagus will be best approximated; all food, liquid or solid, must be avoided, and the patient is to be supported, as long as nature can bear it, by clysters. I object entirely to the introduction of tubes into the pharynx and œsophagus, as worse than unnecessary; for they are highly injurious by the cough which they occasion, by their irritating the wound; and, if adhesion or granulation have taken place to close the wound, such tubes tear it open again, and destroy the process of restoration.

* See case of wounded carotid.

LECTURE XL.

ON WOUNDS OF JOINTS.

THESE accidents are but trivial, or very dangerous, as the surgeon is directed by proper principles, or is ignorant of the treatment which they require.

Improper Treatment.—If the patient has a poultice applied, or if the utmost attention be not paid to the immediate closure of the wound, inflammation of the synovial membrane arises, and suppuration ensues. The most violent constitutional irritation succeeds,—shivering, heat, flushing, and profuse perspiration ; generally, great swelling and excessive pain in the joint. Abscesses form in different parts of the joint, one succeeding another, until the strength becomes exhausted.

In Young or Old Persons.—In young and healthy constitutions, these wounds in the largest joints are recovered from ; but, in aged and weak persons, they destroy life.

Dissection of.—Upon dissection in the first stage, suppurative inflammation of the synovial membrane is found ; in the second stage, the ligaments of the joint are thickened, and the synovial membrane in part ulcerated, in part granulating. The cartilages are absorbed ; granulations arising from some parts of the bones, and exfoliation taking place from other portions.

Anchylosis.—Recovery from these injuries, when inflammation has followed, is by adhesion, so as to destroy the synovial surface ; or else by granulation, when a partial or general ossific anchylosis is the result.

Treatment.—All these effects may be prevented by an intelligent surgeon. When called to treat a wound of from one to two inches extent into the knee joint, he will, with a fine needle and thread, passed through the skin only, (avoiding the ligaments,) bring the edges of the external wound together ; for a wound in the joint is different to most others, as the synovia has a constant tendency to force a passage outwards, and it is more abundantly secreted than usual, so that adhesive plaster is apt to be separated, and union prevented ; he will apply, therefore, lint dipped in blood over the surface of the wound, and place the plaster over it ; then cover the surface of the knee with soft linen, dipped into a lotion of the liquor : plumbi subacet : and spirit. Afterwards he will place a splint behind the limb to prevent all motion of the injured joint, and enjoin positive rest.

Purgatives should be as much as possible avoided, and a rigid abstinence enforced. In eight days, the threads may be cut and thrown

away, but the adhesive plaster and lotion should be continued. Three weeks should elapse before the patient be allowed to quit the bed.

If inflammation follow a wound into a joint, leeches and an evaporating lotion must be employed ; and if it run high, the patient should be bled freely from the arm.

If suppuration be produced, fomentations and poultices are required locally ; liquor : ammoniæ acet : and opium internally.

A fungous granulation forms at the wound, which must not be disturbed, as it is formed by nature to close the aperture ; fresh irritation is produced by disturbing it.

When a limb is stiff from inflammation and adhesion, early motion of the joint is required, and its use may generally be restored. A joint thus circumstanced is not injured, but benefited by motion, whilst in a chronic or scrofulous inflammation of a joint, rest is most essential to its cure. In this case, therefore, a patient should not only use the limb in common exercise, but he should set upon a high table, and employ the muscles, for some length of time at once, in flexing and extending the limb.

Partial ankylosis, when the joint is not altered in form, may, in young persons, be considerably relieved.

Where ossific granulations have arisen from every part of the surface, permanent and complete ankylosis must be the result.

Removal of Loose Cartilages.—In removing loose cartilages from joints, it is proper first to draw down the skin to render the aperture afterwards valvular. The cartilage is fixed by an assistant, an incision is made over it. after the skin has been drawn an inch to one side, then as soon as the surface of the cartilage is well exposed it jumps from its situation, the skin is let go, and then no direct opening remains communicating with the joint.

The after treatment is the same as in simple incised wounds, only a suture is not required.

WOUNDS OF TENDONS.

Tendo-Achillis.—The division of the tendo-Achillis is most frequently occasioned by a wound from an adze, and sometimes the injury arises from accident with a scythe.

Effects of.—In whatever way it is produced, the immediate effect of the division of the tendon is a great separation of its divided portions, the upper one being drawn up by the action of the gastrocnemii, and a falling of the heel, the foot being influenced by opponent muscles. Sometimes the posterior tibial artery and nerve are also divided with the tendon ; where the surgeon should secure the former by a ligature as soon as possible, or else apply a tourniquet.

Mischief of.—The mischief arising from this accident depends in a great measure upon the treatment which may be adopted. If the edges of the wound be not approximated, and if the ends of the divided

tendon are allowed to remain at a distance from each other, inflammation arises, granulations are produced, and a union of the ends of the tendon takes place to the surrounding parts, destroying permanently the action of the muscles, and the motions of the tendon. But if the wound be united by adhesion, and the ends of the divided tendon brought into contact, or nearly so, the motions of the foot are generally restored.

Treatment.—The principle in the treatment is to approximate the ends of the tendon by raising the heel, extending the foot, and bending the knee ; the external wound is then to be carefully closed, in order that it may be healed by the adhesive inflammation. To effect this, a shoe with a heel one inch and a half in height is to be placed on the foot of the injured limb, and a strap is to be carried from the heel of the shoe, to the calf of the leg, then a roller is to be lightly applied upon the upper part of the leg, to confine the strap and to keep the foot extended. The edges of the external wound are to be brought together by a small suture, and all pressure at the part should be avoided, only an evaporating lotion being placed upon it. The patient is to be confined to his bed until the wound be healed, and then he may be allowed to walk a little with a high heeled shoe. This shoe is to have the heel gradually lowered until it becomes of the same thickness as the heel of the shoe worn on the sound side. By this means, the muscles which had contracted, and the tendon which had been injured are gently brought to their proper action.

If the divided extremities of the tendon are allowed to remain separate during the union, an addition is made to the tendon in its length, and the power of the muscle acting upon it is thus reduced.

Should much inflammation arise during the cure, the limb must be elevated to prevent all gravitation of blood, and leeches should be applied near the wound.

Division of Extensor Tendons.—If the extensor tendons of the fingers be divided, the fingers should be kept extended during the cure, by a splint placed under the hand and fingers. Indeed it is only necessary to consider whether the divided tendon, in any case, belongs to a flexor, or extensor muscle, to know what is to be done to assist its union.

PUNCTURED WOUNDS OF TENDONS.

Dangerous.—These are dangerous accidents, being often productive of tetanus. Several times within my knowledge, this has occurred from persons treading upon a nail, which has penetrated the shoe, and wounded the tendinous aponeurosis of the sole of the foot ; also an accident of somewhat similar nature to the palm of the hand, I have seen productive of a similar effect.

Tetanus.—Tetanus seems to be the result of a wound of a structure difficult to heal, and requiring great constitutional efforts to produce

the effect ; and these efforts in a very irritable constitution produce the highest nervous excitement.

Treatment.—In these injuries, I have observed that it is best to foment and poultice the parts, so as to sooth and tranquilize them ; also to carefully avoid depletion, even from the first to any great extent, either locally or constitutionally. The patient should be allowed his common diet, and if he be restless or complain of much pain in the wound, opium should be given. Lowering the patient only adds to his irritability.

OF LACERATIONS OF TENDONS.

Of Tendo-Achillis.—The tendo-Achillis, and sometimes, but not so frequently, other tendons are torn through.

This accident to the tendo-Achillis, is produced either by a violent effort of the muscles, as in jumping or dancing, or by an unexpected extension of the tendon ;—as for instance, by treading unawares with the toe only upon an elevated substance. Dr. Curry, late physician to Guy's Hospital, informed me that he tore his tendo-Achillis by catching his toes upon a scraper, when walking in a dark street ; being at the time unprepared for such an occurrence.

Treatment.—In whatever way the accident may be produced, the treatment required will be to extend the foot, and bend the knee to allow the ends of the lacerated tendon to approximate. In this way the tendon soon unites by the adhesive process, and the use of the limb is afterwards gradually restored. Some degree of thickening of the tendon for a long time remains, and the patient halts a little in rapid motion.

The position of the foot and leg is to be maintained in the same way as when the tendon is divided by incision, and an evaporating lotion should be employed. After the union, the same precautions are to be observed with respect to the employment of the high heeled shoe.

OF PARTIAL LACERATION OF THE TENDO-ACHILLIS AND GASTROCNEMIUS MUSCLE.

Cause of.—A person in running or walking fast, or if his foot slips backwards when it has been advanced, sometimes feels as if he had received a severe blow upon the back of his leg, and is immediately unable to walk, but with the greatest difficulty, and with the foot extended.

The cause of this feeling is a laceration of some fibres of the tendo-Achillis, or of the gastrocnemius muscle, where it joins the tendon. There is great tenderness upon pressure on the following day, with some ecchymosis, which daily increases, until the limb becomes con-

siderably discoloured. The least attempt to bend the foot is accompanied with great pain, and followed by swelling of the leg and ankle.

From a belief that the injury is slight, and from negligence in treating it, the lameness which results from this accident is often of very long continuance; but, if properly attended to from the first, it is in general soon recovered from.

A similar treatment to that recommended for division or laceration of the tendon, is requisite for the cure of this injury, and when the patient can bend the foot without producing pain, then the high heeled shoe must be worn, and the heel be gradually lowered, as in the previous cases.

From three to six weeks are required to effect a cure.

OF WOUNDS OF THE NERVES.

Effect of.—The immediate effect of the division of a nerve of a limb, is the loss of volition in those muscles to which the nerve is distributed, and the antagonist muscles being unopposed, gradually contract. If the nerve supplying the flexors is divided, the limb becomes extended; if that distributed to the extensors is separated, the opponent muscles keep the extremity flexed. This arises from the tendency a muscle possesses to occupy the smallest space possible, and which differs from voluntary or involuntary contraction, as the latter can only continue for a time; but the former is permanent, or as long as the antagonist muscles are paralysed.

The second effect of the division of a nerve is the diminution of sensibility; I call it diminished, because I do not find that the division of the branch of a nerve, although it benumbs the parts, entirely deprives them of sensation.

In the division of the infra orbital nerve, or of one of the nerves of the fingers, some sensation remains, but numbness is produced; when, however, all the nerves passing to an extremity are divided, sensation is entirely destroyed.

Case.—I once saw a case, in which one of the branches of the median nerve was divided in the palm of the hand; and if pressure was made on the radio spiral nerve at the elbow, it produced a tingling sensation in the benumbed finger.*

The temperature of the part to which the nerve is distributed, if it be covered so as to prevent the access of a colder medium, is greater than that of parts similarly covered; but if it be left altogether bare, it then has less power of resisting diminished temperature than the surrounding parts. I have seen severe chilblains, and, during the winter, incurable ulceration follow the division of the median nerve.

Divided Nerves unite.—When a nerve has been divided, if its

* It appears, therefore, as if nervous influence is supported in a degree by anastomosis.

extremities are brought together, it unites, and the function of the nerve becomes gradually restored.

Dr. Haighton's Experiments.—Dr. Haighton divided the *pars vaga* on one side of the neck of a dog, and, after some time, he cut through the nerve on the other side: the dog lived, which he would not have done, had both the nerves been divided at the same time. When he had allowed time for the union of the second, he divided both at once, and the animal died under the same circumstances as would have occurred, had no previous experiment been made.

The time required for the union and restoration of function, appears to depend upon the size of the nerve.

Cases.—A young gentleman who had injured the external condyle of the *os humeri*, had numbness in the direction of the radial nerve, and he recovered the sensibility of the parts in four months.

The numbness sometimes produced by bleeding is recovered from in three months.

In a fracture of the thigh bone, by which the sciatic nerve was injured, so as to produce numbness in the limb below, the person recovered in nine months.

Koschiusko, the Polish General, had his sciatic nerve injured by a pike, and when in this country, many months after receiving the wound, he had not got rid of the effects; and I have heard since, that he remained lame.

At the place of union, after the division of a nerve, there is the appearance of a ganglion, as may be seen in a preparation I made from the finger of a person brought into the dissecting-room at St. Thomas's Hospital, a cicatrix covered the ganglion.

Independent of the size of a nerve, the time in which union will be complete, must also depend much on the position and approximation of the ends.

Treatment.—In the treatment of a wounded nerve, the only objects are the approximation of its ends and union by adhesion.

Many bad symptoms have been attributed to the partial division of a nerve; but I have, in part, cut through the sciatic nerve of a dog, without producing any other symptom than partial paralysis.

Cases.—I removed from the median nerve, a tumour for a gentleman, and took away two thirds of the nerve with it, and numbness with tingling were the only unpleasant symptoms following.

A Mr. H. called at my house, who had a partial division of the median nerve, affecting the fore, middle, and ring fingers, but not the thumb; he had tingling with the numbness, but no other bad symptom.

A nerve divided in part, therefore, occasions tingling and numbness; one completely separated, only numbness; the treatment of the former is as that of the latter.

Ligature on a Nerve.—If a ligature be applied upon a nerve of magnitude, the consequences are sometimes fatal, and sometimes productive of lingering suffering.

Cases.—Mr. Cline informed me, that in a case of popliteal aneurism, operated upon in the old way, by opening the tumour in the ham, the popliteal nerve was included in the ligature with the artery, and that the man died in a few hours.

In a case of amputation at Guy's Hospital, I saw the whole sciatic nerve included in a ligature, which was applied to suppress hæmorrhage from the artery which accompanies the nerve. In four days, the man was seized with violent spasms in the stump. On the fifth day, spasms affected the limb, and from thence extended to the other muscles of the body. On the seventh day, he died.

If a nerve be included in a ligature, when tying an artery, the process of ulceration is extremely slow, and the slightest drawing of the ligature produces agonizing pain.

Lord Nelson suffered excessively from this cause after his limb had been amputated; and with all his heroism, he could not bear the least touch of the ligature, without uttering the most violent expressions.

After amputation, then, it is right to avoid, with the greatest circumspection, any nerve, or portion of a nerve, in placing the ligatures on the vessels.

The division of a nerve, or even pressure upon the spinal marrow, so as to destroy volition and sensation, does not prevent the involuntary action of the limb or limbs from proceeding. The circulation still proceeds, and the irritability of the part remains as is shown in the application of a blister, which produces the usual vesication; also, a wound heals by the adhesive process.

Friction and electricity seem to have some influence in restoring action in a divided nerve, or of one which has partially lost its power from any other cause.

Pressure upon a nerve, occasions the sensation of a part being asleep; striking the cubital nerve at the elbow, occasions violent tingling in the little finger, and half the ring finger.

OF SPRAINS.

Definition.—A sprain is an injury occurring to the ligaments or tendons surrounding a joint, which are either forcibly stretched or lacerated.

How produced.—It usually happens from the sudden extension of the joint in a direction which the muscles are unprepared for; in the same manner as when a dislocation is produced, only that the violence is not sufficient to occasion a displacement of the bones.

Common seat of.—The most common situations of these accidents are either at the wrist or ankle, arising from sudden falls, by which joints are unexpectedly and forcibly bent.

Symptoms.—These injuries are attended with considerable pain at the time of the accident, and the part soon becomes swollen and tender; the former symptoms arises from the effusion of blood in the

first instance, out of the lacerated blood-vessels, and becomes subsequently much increased from inflammation; the tenderness and pain are generally in proportion to the tumefaction.

At first the surface of the skin presents its natural appearance, but after a short time, as the effused blood coagulates, it becomes much discoloured.

Sensation of Crepitus—When inflammation has been set up, and given rise to effusion of fibrin, a sensation of crepitus is experienced on examining the injured part, which might, by an ignorant surgeon, be mistaken for the crepitus of fractured bone; but it never gives that distinct grating feel which occurs from the rubbing of one portion of broken bone upon another.

Motion of Joint destroyed.—Immediately after the receipt of the injury, the ordinary motions of the joints can be readily performed; but as the swelling takes place, these motions become much impeded, and ultimately cannot be performed without producing acute pain, and increasing the mischief.

Treatment.—In the treatment of these cases, the first object is to arrest the hæmorrhage from the lacerated vessels, and then to prevent the occurrence of severe inflammation; afterwards to promote the absorption of the effused matter, and subsequently to restore the motions of the injured parts.

Cold and Position.—In the first instance, the application of cold by means of evaporating lotions, and attention to the position of the limb, will effect much in arresting the effusion, and preventing acute inflammation. The position should be such as to relax those muscles which act on the injured tendons, and at the same time such as will favour the return of blood to the heart.

Bleeding.—Should the pain and tumefaction increase in spite of these means, leeches should be freely employed over the seat of mischief, and the bleeding encouraged by tepid applications; purgatives should also be administered; and in very robust persons, when the injury is extensive, general blood-letting, and other constitutional remedies must be had recourse to.

After Effects.—When the inflammation is subdued, and the patient is free from pain, still the surgeon has much to do in effecting the absorption of the effused matter, and this he should be careful to remove, as it is from neglecting this stage of the injury that other and more important disease originates, this more particularly in persons suffering from constitutional disease, as in those affected with scrofula.

In Healthy Persons.—In persons free from constitutional disease, these injuries, if not very extensive, are rapidly recovered from; the effusion quickly subsides, and the motion of the joint are restored; but in no case should the patient be allowed to exercise the part as usual, until all pain has ceased, and the part has nearly regained its original form.

Too early Motion.—By a too early use of the part, the effects of the injury are kept up, so that weeks, months, or even years may

elapse ; and the patient still suffer from them ; whereas a little more attention to the disease in the first instance, would have completely removed all the suffering and danger.

In Unhealthy Persons.—In persons suffering from constitutional disease, a chronic form of inflammation is often set up, which terminates in suppuration, and often affects the bones, which become carious, and make it necessary for the surgeon to remove the diseased part by amputation, in order to save the patient's life.

Therefore, after the acute symptoms have been removed, be careful to get rid of all the effect of the injury before the patient be allowed to employ the limb, as previous to the accident.

Treatment of Chronic Stage.—Rest, position, and the use of mild stimulants, with friction and moderate pressure, are the best means of producing the desired effect. The liniment : ammoniæ ; liniment : hydrargyri ; liniment : saponis, may either of them be rubbed over the affected part, night and morning, afterwards making pressure by the application of a roller ; or the part may be enveloped in strips of one of the following plasters :—Empl : ammon : c. hydrarg : Empl : Galbani, over which the roller should be placed. I have also known good effects produced from the pouring a continued stream of cold water on the part from a pump or large pitcher.

Should the disease prove obstinate, and be attended with occasional pain, the aid of counter irritation may with great advantage be produced, either in the form of blister, or the Ung : Antimon : Tartarizat : I have known many cases quickly cured by these means.

Exercise.—When the marks of disease have been removed, the motions of the parts should be promoted by moderate, but regular exercise.

LECTURE XLI.

OF DISLOCATIONS.

Definition.—A DISLOCATION is the displacement of the articulatory part of a bone, from the surface on which it was naturally received.

I shall first make some general observations on these accidents, and afterwards describe the particular dislocations.

Require immediate Assistance.—There are few accidents to which the human body is liable, that are more likely to endanger the reputation of the surgeon, than dislocations, as the restoration of the injured parts depends very much upon his decision and immediate assistance ; for, if much time escape before the parts are restored to their natural

positions, the reduction is rendered proportionably difficult, and may become perfectly impracticable ; when the patient becomes a living memorial of the surgeon's ignorance.

Consequence of neglect.—I have known several instances in which the want of professional knowledge or inattention, on the part of the surgeon, to these accidents, has been the occasion of irrecoverable deformity in his patient, and of the loss of his own professional character.

Anatomical Knowledge requisite.—An accurate knowledge of the anatomy of the joints is necessary, to enable the surgeon readily to detect the nature of many dislocations, as also to adopt the best means of reducing them. Let me, therefore, entreat you to examine and study well the structure of the different joints, the forms of articulation, the bones and cartilages composing them, the ligaments connecting them, and the action of the muscles moving them ; as, without this knowledge, you cannot practice your profession with credit to yourselves, or to the advantage of those who may come under your care.

I have known a case of fracture of the neck of the thigh bone treated as a dislocation, and the pulleys applied to the limb, by a hospital surgeon, who was deficient in anatomical knowledge.

Sometimes difficult to detect.—In some cases, however, so much tumefaction arises from extravasation of blood, or the parts become so tense with the effusion, in consequence of inflammation, that the best surgeon will not be able exactly to ascertain the precise nature of the injury during the first few days after its receipt ; it would be, therefore, extremely illiberal and unjust to attribute ignorance to a surgeon who might have given an incorrect opinion under such circumstances.

Immediate Effects.—The immediate effects of a dislocation are, to produce an alteration in the form of the joint, in the length and ordinary position of the limb ; also, after a short time, when the muscles have contracted, to destroy the motions of the joint.

At first, much Motion.—*Case.*—In the first few minutes, however, after the injury, the degree of motion is considerable, which I had an excellent opportunity of seeing in a patient brought to Guy's Hospital, with a dislocation of the thigh bone into the foramen ovale, which had occurred only a few minutes before his admission. The nature of the injury was extremely well marked, only there was great mobility of the limb at first, but in less than three hours it became firmly fixed by the contraction of the muscles.

Limb Lengthened or Shortened.—In dislocation of the extremities, the limb is usually shortened ; but when the femur is displaced into the foramen ovale, or the humerus into the axilla, the limbs are lengthened.

Pain.—A dull pain is felt from the pressure of the dislocated bone upon the muscles, but the pain is sometimes severe when the bone rests upon a large nerve or nerves, as when the femur is dislocated into the ischiatic notch, or the humerus into the axilla ; and, from the same cause, numbness and a partial paralysis of the limb are also produced.

Vessels injured.—The large blood-vessels also, occasionally, receive much injury from these accidents. I have known the subclavian artery so much compressed by a dislocation of the sternal extremity of the clavicle backwards, as to stop completely the pulsation of the wrist. In another case, the axillary artery was so much injured by a dislocation of the humerus into the axilla, as to give rise to aneurism, for the cure of which the subclavian artery was tied.

Head of Bone felt.—If there be not much extravasation or effusion, the head of the displaced bone may be easily discovered in its new situation, and may be distinctly felt to roll, if the limb be rotated. In some instances, the usual prominence of the joint is lost, as when the humerus is dislocated into the axilla, or an unnatural projection occurs, as in dislocations of the elbow.

Remote Effects.—The remote effects of these injuries are,—First. The sensation of crepitus, which occurs a day or two after the accident, from the effusion of fibrin into the joint or bursæ, although it does not give that grating feel which arises from the motion of the fractured ends of a bone upon each other; yet, I have known medical men, not aware of this circumstance, suspect a fracture when none existed.

Inflammation.—In general, the degree of inflammation arising from these injuries is very slight. Sometimes, however, it is considerable, causing, together with extravasation, great tumefaction of the surrounding parts, and rendering it difficult to ascertain the nature of the injury. I have known, in a few instances, so high a degree of inflammation to follow the receipt of these injuries, as to destroy the patient.

Case.—A master of a ship who had dislocated his thigh upwards, a few days after its reduction, had extensive suppurative inflammation take place in the thigh, under which he sunk.

Mr. Howden, a surgeon in the army, has given the history of a somewhat similar case to the Physical Society of Guy's Hospital.

Dissection of Parts.—On dissecting the injured parts in those who die shortly after a dislocation from violence, the capsular ligament is found torn transversely to a great extent, and the peculiar ligaments of the joint are also ruptured, the head of the bone being removed from its socket.

In dislocations of the hip, I believe the ligamentum teres is always torn through, or separated from its attachment, sometimes with a piece of cartilage, or even of bone.

When the humerus is dislocated, however, the tendon of the biceps, which answers the purpose of a ligament, is, as far as I have had an opportunity of witnessing, uninjured,—although I do not mean to deny the possibility of its being ruptured.

Tendons and Muscles injured.—The muscles and tendons surrounding the joint are frequently much injured, as, for instance, the tendon of the subscapularis muscle, when the head of the humerus is displaced into the axilla, or the pectineus and adductor brevis muscles, in dislocation of the femur into the foramen ovale.

When unreduced.—When a dislocation has remained unreduced

for a length of time, some degree of motion is gradually restored, but the power and mobility of the limb are never completely regained ; and, in the dislocations of the thigh, the patient is ever after lame.

Dissection of.—In dissecting cases of this kind, the head of the bone is found much altered in figure ; this alteration, however, does not depend very much upon the length of time that the bone has been displaced, but more upon the structure which the head of the bone presses on, whether bone or muscle.

If the Bone rests on Muscle.—If it rest upon muscle, the bone undergoes but little change, its articular cartilage remains, and a new capsular ligament forms around it, from the thickening and condensation of the surrounding cellular tissue.

If on Bone.—If, on the contrary, it presses upon bone, an extraordinary change is produced, both in the head of the dislocated bone, and in the osseous surface on which it rests. The articular cartilage becomes absorbed from the dislocated extremity, and the periosteum of the bone on which it presses is removed in the same manner, so that a smooth hollow surface is formed, to which the head of the displaced bone becomes adapted. At the same time that the hollow is formed at that part on which the head of the dislocated bone immediately presses, a deposit takes place from the surrounding periosteum, between it and the surface it naturally covers, by which a ridge or lip is produced, forming with the depression a deep cup to receive the head of the bone ; also, the tendons or muscles which were lacerated, are united, and the latter accommodate themselves to their altered positions, so that, by a beautiful and gradual change in the injured parts, a new articulation is established.

On account of the great change which thus occurs when a dislocation has remained unreduced for a length of time, it becomes impossible to restore the bone to its original position, and after the expiration of many weeks, such an attempt would not only be absurd, but attended with much risk to the patient.

Case.—In an attempt to reduce a dislocation of the humerus, which had existed only six weeks, so much injury was done to the muscles by the violence employed, that the patient died in consequence.

Dislocation from Effusion.—But although dislocations are generally occasioned by violence, and are accompanied by laceration of the ligaments, yet they occasionally arise from relaxation of the ligaments only, the result usually of a morbid accumulation of synovia in the joint.

Of Patella.—I have seen the patella frequently displaced from this cause ; and, in the year 1810, I admitted a girl into Guy's Hospital, who was the subject of such dislocation. The patella was suddenly and frequently thrown outwards in walking, which occasioned her to fall, and it required considerable force to reduce it. By the application of some strips of plaster, and a bandage, the bone was readily kept in its proper situation.

Case.—I once saw a girl who had the power of throwing the patella outwards at will,—she had been brought up as a dancer or tumbler.

From Paralysis.—The loss of power in muscles surrounding a joint, either from paralysis, or from being kept a long time upon the stretch, allow of the joint being easily dislocated ; but, under such circumstances, the reduction is effected without difficulty.

Case.—A young gentleman who had become paralytic on one side during dentition, would readily dislocate the head of the humerus, throwing it over the posterior edge of the glenoid cavity, from whence it could be replaced with facility.

The loss of muscular power, arising from continued extension, is well illustrated by the following case :

Case.—A junior officer, on board of one of the Company's ships in India, was punished by one of the mates, during the absence of the captain, in the following manner :—His foot was placed upon a small projection on the deck, and his arm was tied and forcibly drawn toward the yard of the ship ; in this position he was kept for one hour. After this, the muscles of the arm gradually wasted, and the bone could be dislocated merely by his raising the extremity to his head, but was easily replaced by slight extension.

Muscles prevent Dislocation.—These cases prove also, that the muscles in a healthy state must have considerable influence in preventing displacement from violence, as also of resisting the reduction when dislocation has occurred.

From Ulceration.—Another more frequent cause of dislocation, is ulceration, by which the attachments of the ligaments are destroyed, when displacement of the joint takes place, either from the action of the muscles, or from their not being sufficient support to counteract the weight of the bone. Thus, in long continued ulcerative disease of the hip-joint, we find the head of the femur drawn up on the dorsum of the ilium : and, in the same affection of the knee, I have seen the tibia sink off the condyles of the femur.

Case.—There is in the Museum at St. Thomas's Hospital, a preparation, showing an ankylosis of the tibia, at right angles with the femur, after a dislocation from ulceration.

Dislocation with Fracture.—It frequently happens that a fracture occurs at the same time with a dislocation ; this is more especially the case in the displacements of the ankle-joint which seldom take place without fracture. The acetabulum is sometimes broken in dislocations of the hip, and the coronoid process of the ulna is occasionally separated when that bone is dislocated, which renders it scarcely possible for the surgeon to preserve the parts in their natural position during the treatment.

Case.—A preparation in St. Thomas's Museum, shows a fracture of the head of the humerus, occurring with displacement.

Treatment.—When dislocation and fracture of a bone occur at the same time, the dislocation should, if possible, be reduced immediately, taking care to prevent further injury to the fractured part, by the ap-

plication of bandages and splints. For, if the fractured bone be allowed to unite before attempting to replace the dislocation, such union would most probably be destroyed by the additional violence necessary to reduce the bone, after having remained so long out of its natural situation.

So, also, if a bone in one limb is dislocated, and in another fractured, the dislocation should be reduced as soon as the fractured bone has been supported and secured from injury.

Dislocations not complete.—Dislocations are not always complete; but in some instances a partial displacement of an articulating surface occurs. A preparation in St. Thomas's Museum, dissected by Mr. Tyrrell, shows an imperfect dislocation of the ankle; the end of the tibia rests still in part upon the astragalus, but the greatest portion is seated on the os naviculare.

Of the Knee.—The knee-joint, on account of the extensive articular surfaces, is seldom completely displaced.

Of the Humerus.—The humerus is sometimes thrown upon the anterior edge of the glenoid cavity, but is easily replaced.

Of the Elbow.—The elbow-joint is liable to partial displacement, both of the ulna and radius.

Supposed Dislocation of Vertebrae.—The injuries to the spine, which are sometimes called dislocations, and are producing paralysis of the part of the body below the seat of mischief, are really fractures with displacement of the broken bone. Simple dislocation of the vertebrae, I believe to be an exceedingly rare accident, if we except that which is said to occur sometimes between the first and second cervical vertebrae.

Causes, Violence.—Violence is usually the cause of dislocations, and is generally applied unexpectedly, when the muscles are not prepared for resistance, and when the bone is in an oblique position with respect to its socket. Under these circumstances, very slight force will produce the displacement which could not otherwise be occasioned, but by great violence.

Execution of Damien.—The power of the muscles in resisting excessive force, when prepared for its application, is well illustrated by what occurred in the execution of Damien, for an attempt to murder Louis the XVth. Four young horses were fixed, one to each limb, and were then compelled to draw in different directions, for the purpose of tearing the limbs from his body; but this could not be effected, and after fifty minutes' trial, the executioners were obliged to cut through the muscles and ligaments, before the limbs could be separated.

Dislocation rare in Old Persons.—Old persons are much less liable to dislocation than those of a middle age, as from the difference in the firmness of their bones, those of the former are much more easily broken than displaced.

In very Young.—In very young persons also, dislocations are rare, as the bones break, or the epiphyses give way under the violence

which would otherwise displace them. I have, however, known an instance of dislocation in a child of seven years of age. Displacement often occurs in children from ulceration, as I have already described, and is most frequent at the hip-joint. I have seen several cases which have been supposed dislocations of the elbow-joint in children, but were really oblique fractures of the condyles of the humerus, in which one or both bones of the forearm were drawn backwards with the portion of the condyle.

Compound Dislocation.—In a compound dislocation, besides the displacement of the articulating surfaces, the cavity of the joint is opened by a division of the exterior soft parts, as the integument, capsular ligament, &c., so that the synovia escapes through the wound.

Danger of.—This injury is generally attended with considerable danger, on account of the inflammation which occurs in the synovial membrane and lacerated ligaments; the former being of the mucous kind, quickly takes on the suppurative inflammation, and thus a profuse discharge rapidly ensues. The articular cartilages covering the extremities of the bones are gradually destroyed by an ulcerative process, and the bones inflame: granulations are thrown out from the extremities denuded of cartilage, so as to fill up the cavity. Generally these granulations unite, and become ossified, producing ankylosis, but occasionally some degree of motion is gradually regained.

Often require Amputation.—To effect all this, great constitutional powers are necessary, and persons naturally weak are often, under these circumstances, obliged to submit to the removal of the limb to preserve life.

Rare in some Joints.—Compound dislocation occurs but very rarely in some joints, as the hip, shoulder, and knee; but is often met with in the ankle, elbow, and wrist.

Judicious Treatment.—Much may be done in these cases by judicious treatment in the first instance, when the object should be to promote adhesions of the external wound, and thus render the dislocation simple. Instead of applying emollients, therefore, to encourage suppuration, which is productive of so much mischief, the edges of the wound should be carefully approximated by strips of plaster, and evaporating lotions should be applied over the limb, which should be left undisturbed for several days.

I shall, however, enter more fully into the treatment of these injuries, when describing the particular dislocations.

TREATMENT OF SIMPLE DISLOCATIONS.

Reduction.—The first and principal object is the reduction of the dislocated bone, which I have mentioned, becoming difficult in proportion to the time allowed to escape after the receipt of the injury.

Difficulty increases as Time elapses.—If the muscular power be great, great force will be required to overcome the contraction of the

muscles, and this difficulty will increase in proportion to the length of time allowed to pass by between the injury and the attempt to reduce the dislocation. In very muscular persons, therefore, no endeavour should be made to reduce a dislocation of the arm, after a lapse of three months from the receipt of the injury ; but in persons with little muscular power, reduction may be effected before the expiration of four months after the accident. In displacement of the thigh, two months in stout persons, and a few days more in those of relaxed fibre may be allowed as the period after which it would be wrong to employ violent means to endeavour to reduce the dislocation.

From Contraction of Muscles.—The difficulty in reducing dislocations is chiefly owing to the contraction of the muscles, which is involuntary, and which becomes greater in proportion to the length of time which has elapsed after the injury. The muscles have a power of contraction independent of the voluntary or involuntary action, which are common to them, and the former of which cannot be maintained but for a very limited period.

Effect on Muscles.—When the power of a muscle is destroyed, the antagonist muscle immediately contracts, and this contraction is permanent, or as long as the power of the other muscle is wanting. This may be seen in those persons who have suffered from paralysis of the muscles on one side of the face, the opposite side being drawn up and disfigured by the contraction of the opposing muscles. In the same way when a dislocation has taken place, the muscles soon contract and fix the bone in its new position, and this contraction becomes firmer and more difficult to overcome, the longer the time allowed to elapse before any attempt be made to replace the bone. The reduction should therefore be made as soon as possible after the receipt of the injury.

Other Causes creating Difficulties.—But independent of the muscular contraction, other circumstances give rise to difficulty in attempting to reduce a dislocation of long standing, and often render the reduction impracticable. The head of the bone becomes adherent to the surrounding parts, so that when the muscles have been divided in dissecting the injured joint, the bone cannot be replaced ; this I have observed in the dislocation of the humerus, and also of the radius. After a time the original cavity becomes filled with new matter, and sometimes a new articular socket is formed for the head of the dislocated bone ; under these circumstances the possibility of the reduction is destroyed.

Form of Joints.—In recent dislocations, the form of the joint may in some instances afford an obstacle to the reduction ; as, when the articular cavity is surrounded by a projecting edge as in the hip, in which case the head of the bone requires to be lifted over the edge when reducing the displacement. If the head of the bone be much larger than its cervix, as in the radius, it affords an impediment to the reduction.

Capsular Ligament.—Some persons have supposed that the return of a dislocated bone to its natural position, might be impeded by the

smallness of the aperture in the capsular ligament; but this cannot happen, as the ligament is inelastic, and an aperture admitting the dislocation would as readily admit of the reduction. The capsular ligaments possess, in fact, but little power of preventing dislocations, and the protection is principally afforded by the peculiar ligaments and tendons covering each joint.

Constitutional Means.—Constitutional, as well as mechanical means, are often necessary to assist in the reduction of dislocations; and, in many cases, the employment of force only is very improper; as unassisted by constitutional means, much greater violence must be exercised, and consequently the immediate suffering, and subsequent inflammation, will be proportioned to this violence.

Bleeding, &c.—Bleeding, the warm bath, and such medicines as create nausea, are the best means of assisting constitutionally in the reduction of dislocation, as they most readily produce a state of faintness, during which the muscular power is greatly diminished. Bleeding is the most powerful, and at the same time the most speedy method of the three, if the blood be drawn from a large orifice, and the patient be kept in the erect position; it cannot, however, be resorted to in all cases, and might be highly injurious in very old or debilitated persons; but in the young and robust it may be employed with safety and advantage in the mode I have proposed.

Warm Bath.—In using the warm bath, the temperature should be from 100° to 110° ; and the heat should be kept up until the patient feels faint, when he should be taken out, and the mechanical means should be immediately resorted to. The desired effect is much sooner produced by abstraction of blood, during the time that the patient is in the bath, than by bleeding, or the bath singly.

Creating Nausea.—The third mode, viz., that of exciting nausea by the exhibition of tartarised antimony in small doses, is not so certain as the former modes, but it is exceedingly useful in keeping up the state of faintness produced by bleeding or the warm bath, when the dislocation has been of long standing and likely to require a continued application of mechanical means for its reduction.

Opium.—Opium might, perhaps, be serviceable in large doses, as it greatly diminishes muscular power. I have not yet tried it.

Mode of Reduction.—When the power of the muscles has been lessened, the reduction of the dislocation should be attempted, by fixing one bone, whilst the extremity of the other is drawn towards the socket by extending the limb. Inattention to this point is one of the great causes of failure in attempting to reduce dislocations; for if the bone in which the socket is situated be not fixed, the reduction cannot be accomplished. If, for instance, in attempting to reduce a dislocation of the humerus the scapula be not fixed, it is necessarily drawn down with the os humeri, and the extension is unavailing. If one person holds the scapula, whilst two extend the humerus, the extension will still be very imperfect: the one bone must be firmly fixed, at the time that the other is extended, to render the force effectual. The extension should be

gradually and carefully made, and continued rather to fatigue than extend the muscles by violence. Violence is as likely to lacerate sound parts as to reduce the dislocation, and this I have known to occur.

Use of Pulleys.—The force required may be applied by the aid of assistants, or by compound pulleys, and in cases of difficulty the latter is much the more preferable mode, as the extension can be thus made gradually and continued; whereas that made by assistants, is usually irregular, and often ill-timed, being more likely to tear the soft parts than to restore the bone to its natural situation.

In all dislocations of the hip, and in those of the shoulder, of long standing, pulleys should always be employed, in preference to any other mode of extension, although I do not deny the possibility of reducing these dislocations by the aid of assistants only.

Relaxation of Muscles.—In endeavouring to reduce a dislocation, the position of the limb should be such as to relax as much as possible, the larger muscles, by which the reduction may be greatly facilitated.

Points for Extension.—A difference in opinion exists, whether the extension should be made from the dislocated bone, or from the limb below. M. Boyer, who has had great experience in surgery, prefers the latter, but in my own opinion it is best to apply the force to the bone which is dislocated, although in recent dislocations of the humerus, I usually make extension from the wrist, drawing the arm in a line with the side of the body, at the same time placing my heel in the axilla.

Effect of Will.—Much may be done in these cases, at the time the surgeon is attempting the reduction by drawing the patient's attention from the accident, as the muscles are affording much resistance in obedience to the will, as long as the mind is directed to them; but this subsides as soon as any other circumstance engages the patient's attention. Thus I have reduced a dislocation of the humerus, by directing a patient to rise, at the time I was making extension by the wrist, having my heel in the axilla, after having made various unsuccessful efforts, whilst he was recumbent. In attempting to rise, the mind was directed to other muscles than those opposing the reduction; and thus the force they had previously exercised, was so far diminished as to allow of the reduction.

Mode of applying the Pulleys.—Before applying the pulleys, a wetted roller should be put round the limb, and the leather to which the rings are fixed to receive the hook of the pulleys, should be buckled on over this roller; this will prevent it from slipping during the extension. The cord should at first be drawn very gently, until the resistance of the muscles is felt, when the surgeon should rest for two or three minutes, and then gradually and carefully extend again, and so on until he perceives the muscles quiver; after which a very little more extension will accomplish the desired purpose.

When reduced.—The surgeon may know when dislocation is reduced, by the restoration of the natural figure of the articulation.

After-treatment.—For some time after the reduction of the dislocation of the shoulder of long standing, bandages are required to retain

the bone in its proper situation ; and the same treatment must be adopted after similar accidents to those joints in which the articular cavity is shallow.

In all cases after reduction, rest is necessary, to allow of the union of the ruptured ligaments; evaporating lotions should be employed to prevent excess of inflammatory action, and leeches should be applied if the inflammation run high. Subsequently friction will be found of great service in restoring the natural functions of the joint.

The injuries to the spine, commonly described as dislocations, have been already treated of in a former lecture. I shall now, therefore, proceed with the description of these injuries to the other articulations, and commence with those taking place at the junction of the ribs.

OF DISLOCATION OF THE RIBS.

Three Forms.—Three forms of dislocation are mentioned as occurring to the ribs and their cartilages ; viz.—First, a displacement of the posterior or vertebral extremity forwards on to the body of the vertebræ. Second, a separation of the anterior extremity of the rib from its cartilage. Third, a similar injury between the cartilage and the sternum.

Cause of First Form.—The dislocation of the vertebral extremity might occur from a person falling backward on some pointed substance, so as to drive the head of the rib from its natural situation : such accidents are, however, very rare.

Signs of.—This injury would produce symptoms nearly similar to those from fracture of the rib, as pain on motion, and difficulty of respiration.

Treatment.—The same mode of treatment would be also proper in either case ; as bleeding to prevent inflammation, and the application of a roller to confine the motions of the ribs.

Displacement of Cartilage.—When a cartilage has been separated and displaced either from the rib or from the sternum it may usually be replaced with ease, if the patient will take a deep inspiration, so as to enlarge as much as possible, the diameter of the chest ; for under these circumstances very slight pressure will return the parts to their original position.

Treatment.—After the reduction, a small compress confined over the seat of injury by a bandage, as applied for fractured rib, will be requisite to prevent any further displacement.

⚭ *Deformity of Ribs.*—In sickly and weak children, an alteration sometimes takes place in the form and direction of the cartilages of the ribs, which might be mistaken for a dislocation. It most frequently occurs at the cartilages of the sixth, seventh, or eighth ribs, and is accompanied with some alteration in the course of the ribs themselves.

DISLOCATION OF THE CLAVICLE.

Articulations strong.—The articulations of the clavicle with the sternum, and with the scapula, are so firm as to render displacement of either extremely rare, when compared with the dislocation of some other joints.

DISLOCATIONS OF THE STERNAL EXTREMITY.

Two Kinds.—The sternal end of the clavicle may be displaced in two ways ;—first, when thrown anterior to the sternum, or forwards ;—second, backwards, or behind the sternum.

Anteriorly.—In the anterior dislocation, a swelling is readily perceived on the anterior and upper part of the sternum ; and if the finger be carried on the surface of the sternum upwards, this projection stops it. On placing the knee between the scapulæ and drawing the shoulders backwards, the swelling disappears ; but it re-appears when the shoulders are again allowed to advance. If the shoulder be elevated, the swelling descends, and if the shoulder be depressed, the projection ascends towards the neck.

Pain from Motion.—The patient experiences much difficulty in moving the shoulder, and the attempt creates pain ; but when at rest, he suffers but little pain or inconvenience. In very thin persons, the nature of the accident is at first view easily detected, but some difficulty may occur in ascertaining its nature in very fat people.

Cause.—This injury is generally occasioned by a fall, either on the point of the shoulder, which drives the clavicle inwards and forwards, or upon the elbow, at the time that it is separated from the side, which produces the same effect.

Sometimes a partial Displacement.—Sometimes this dislocation is only partial, the anterior part of the capsular ligament alone being lacerated ; in this case the projection is but slight, but most frequently all the ligaments are torn through, and the bone with the interarticular cartilage is completely displaced.

Treatment.—This dislocation is easily reduced by drawing the shoulders backwards, by which the clavicle is drawn off the sternum, when it falls into its natural situation ; but the shoulders must be kept in this position to prevent a recurrence of the displacement, and the arm must be supported, or its weight will affect the position of the bone.

The application of the clavicle bandage and pads in the axillæ will effect the first object, and the second will be gained by placing the arm in a short sling.

Posterior Dislocation very rare.—I have never seen or known of an instance, in which the dislocation backwards has been produced

by violence ; yet I conceive that it might happen from a blow on the fore part of the bone.

From Deformity.—The only case of this form of dislocation that I have known, was occasioned by great deformity of the spine, from which the scapula was thrown so much forwards, as not to leave sufficient space for the clavicle between it and the sternum : in consequence of this the clavicle was gradually forced behind the sternum, where it pressed upon the œsophagus, and gave rise to so much inconvenience, as to occasion a necessity for the removal of the extremity ; the trachea from its elasticity escaped pressure, being pushed to one side.

This case was under the care of Mr. Davie, surgeon, at Bungay, in Suffolk, from whom I had many of the particulars. He deserved great praise for suggesting the mode of relief ; and the skill with which he performed the operation was a proof of the soundness of his professional knowledge.

Case.—Miss Loffty, of Metfield, in Suffolk, had very great distortion of her spine, by which the scapula was gradually thrown so much forwards, as to displace the sternal extremity of the clavicle, forcing it inwards behind the sternum, so as to press upon the œsophagus, and occasion great difficulty in swallowing.

She had become very much emaciated.

Mr. Davie thinking that he could relieve the sufferings of the patient, and prevent the threatened destruction of life, by removing the sternal extremity of the clavicle, performed the following operation :—

He first made an incision of between two and three inches in extent, over the seat of the dislocation, in a line with the direction of the clavicle. After dividing the soft parts surrounding the bone, he placed a portion of stiff sole leather behind it, while he carefully sawed through it, about one inch from its end, with Hey's saw ; he then elevated it, and separated it from the interclavicular ligament.

The wound afterwards healed quickly, and the patient was again able to swallow without difficulty. She lived six years after the performance of the operation.

DISLOCATION OF THE SCAPULAR EXTREMITY.

Upwards.—I have not ever seen any other dislocation of the scapular extremity of the clavicle, than that in which the end of the clavicle is thrown above the acromion process ; and I should conceive it very unlikely for any other form to occur ; but I do not mean to deny the possibility of a displacement beneath the acromion process of the scapula.

This extremity is more frequently dislocated than the sternal end, and may be detected by the following signs :—

Signs of.—The shoulder of the injured side appears depressed, and drawn nearer to the sternum, than the sound one. This arises from

the scapula having lost the support of the clavicle. On examination, the nature of the injury is readily ascertained, by passing the finger along the spine of the scapula, so as to trace the continuation of the acromion with it; in doing this, the finger is stopped by the extremity of the clavicle, which projects above the acromion, and pain is experienced when this elevation is pressed. The swelling disappears when the shoulders are drawn backwards, but rises again if they are allowed to come forward. Pressure upon the end of the dislocated bone causes pain; but when at rest, the patient suffers but little.

Causes.—This injury is most frequently occasioned by a fall upon the shoulder, by which the scapula is forced inwards towards the chest.*

Treatment.—The reduction of the displaced bone in these cases, may be, in most instances, readily accomplished, by placing the knee between the scapula of the patient, and then drawing his shoulders backwards and upwards. After the reduction, a pad or cushion should be placed in each axilla, for the purpose of elevating the scapulæ, keeping them from the side of the thorax, and to defend the soft parts from the bandage, which should next be applied, as in the former case, only it should be broad, and made to press over the seat of injury. The employment of a short sling is likewise of essential importance.

Not perfectly recovered from.—It rarely happens that these accidents to the clavicle are perfectly recovered from; some degree of deformity usually remains, and of this the patient should be informed at the commencement of the treatment, otherwise he may attribute it to the negligence or ignorance of the surgeon; but this deformity will not interfere with the future motions of the joint.

DISLOCATION OF THE OS HUMERI.

Four Directions.—The head of the humerus may be displaced from the glenoid cavity of the scapula, in four directions;—three of the dislocations are complete, and one not perfectly so.

The first is downwards and inwards into the axilla.

The second is forwards, under the pectoral muscle, below the clavicle.

The third is backwards, on the dorsum of the scapula, below the spine.

The fourth is only partial, when the head of the bone rests against the external side of the coracoid process of the scapula.

OF THE DISLOCATION IN THE AXILLA.

Signs of.—This dislocation may be known by the following signs:—The rotundity of the shoulder is destroyed, and a hollow may be felt

* I have known the dislocation arise from a blow, by the falling of a heavy piece of timber upon the extremity of the shoulder.—T.

below the acromion process of the scapula, in consequence of the head of the humerus being displaced from the glenoid cavity, by which the deltoid muscle loses its support, and is dragged down with the depressed bone. The arm is lengthened, as the superior extremity of the humerus is placed beneath its natural articular surface. The elbow is separated from the side, and cannot be made to touch it, but with difficulty, as the effort presses the head of the bone upon the axillary nerves, occasioning severe pain, and the patient generally supports the arm with the hand of the sound limb to prevent the weight from pressing on these nerves. If the elbow be far removed from the side, the head of the os humeri can be easily felt in the axilla, but not so if the arm be allowed to remain nearly close to the side; raising of the limb throws the head of the bone downwards, and to the lower part of the axilla, so that it can be more readily felt.

The motions of the joint are in a great degree destroyed, especially upwards and outwards, and the patient cannot raise his arm by muscular effort; for this reason, it is usual, when wishing to detect a dislocation, to ask the patient if he can raise his hand to his head. The answer invariably is, that he cannot, if a dislocation exists. The arm cannot be rotated, but a slight degree of motion backwards and forwards still remains.

Motion sometimes Considerable.—In very old persons, and in those having a relaxed state of muscles, the degree of motion is occasionally but little inferior to that which exists when the bone is in its natural state.

Crepitus.—Some time after the accident, a crepitus may be often felt, occasioned by inflammatory effusion, and from the escape of synovia; but it is never so distinct as that produced from fracture.

There is frequently a numbness of the fingers, from the pressure of the head of the bone upon the axillary nerves.

Thus it will be found, that the principal marks of the accident are, the loss of the rotundity of the shoulder, the presence of the head of the bone in the axilla, and the destruction of the natural motions of the joint. But often these marks are but little apparent in a few hours after the receipt of the injury, from the extent of swelling which occurs, on account of extravasation; they, however, become again distinct when the tumefaction and inflammation have subsided. Under these latter circumstances it is, that the London surgeons are generally consulted, when the nature of the injury cannot be mistaken; whereas, the general practitioner is called upon during the state of tumefaction and inflammation, to form his opinion, and should he then overlook a dislocation, it is our duty, in justice to the general practitioner, to inform the patient that the difficulty of ascertaining the true nature of the accident is very greatly diminished by the cessation of swelling and inflammation.

The readiness with which the injury may be detected, will also differ much in very thin and emaciated persons, or in those loaded with fat, and possessing large and powerful muscles.

Causes.—The most common causes of this accident, are falls upon the hand, when the arm is above the horizontal line, or upon the elbow, when the arm is raised from the side ; but more especially by a fall upon the shoulder itself, when the muscles are unprepared to resist the violence.

Liability to recur.—When the arm has been once displaced, it is much more liable, after the reduction, to be again dislocated, unless great attention be paid to the injured joint ; and very slight causes will often produce a recurrence of the injury, which I have known take place merely from the action of lifting up the sash of a window.

Case.—When an apprentice at St. Thomas's Hospital, as I was one morning going through the wards, I was called to visit a man who had dislocated his shoulder in the ordinary effort of stretching himself, and rubbing his eyes, when he first awoke.

Proper Mode of preventing.—To prevent as much as possible this disposition to future dislocation, the limb should be kept perfectly at rest for three weeks after the reduction, during which time, a pad should be fixed on the axilla, and the arm bound to the side ; thus the lacerated parts will have time and opportunity to unite, which they cannot well do if the usual motions are permitted.

Dissection.—I have had opportunities of dissecting two recent cases of the dislocation downwards, in which I found the following appearances :

Cases.—In the first case, the axillary vessels and nerves were forced backwards upon the subscapularis muscle, by the head of the dislocated humerus. The deltoid muscle was drawn down, and the supra and infra spinati muscles were stretched over the glenoid cavity, and inferior edge of the scapula. The head of the bone was seated between the coraco brachialis and axillary plexus. The capsular ligament was extensively lacerated on the inner side of the glenoid cavity, as was also the tendon of the subscapularis muscle, where it covers the ligament.

In the second case, violent attempts had been made to reduce the dislocation five weeks after its occurrence, but without success, and the patient died from the effects of the violence used in the extension. The pectoralis major was slightly lacerated, the supra spinatus very much so ; the infra spinatus and teres minor were also torn, but not to any great extent ; the deltoid and coraco brachialis had also suffered a little. The capsular ligament had given way between the teres minor and subscapularis tendons, the latter being separated from the lesser tubercle of the humerus.

Muscles affording resistance.—In these dissections, I found that the supra spinatus and deltoid muscles were those which afforded the chief resistance to the reduction of this dislocation : therefore, in order to effect the reduction, the best direction in which the arm can be extended, is at a right angle with the body. The biceps should be at the same time relaxed by bending the elbow.

In examining a dislocation which has existed for several years unre-

duced, the head of the bone is found much altered in form, being flattened on that side next the scapula, but it is perfectly covered by a capsular ligament. The glenoid cavity is completely filled by a substance of a ligamentous nature, with some small portions of osseous matter suspended in it, and a new articular surface is formed for the head of the dislocated bone, on the inferior costa of the scapula.

OF THE REDUCTION OF THE DISLOCATION IN THE AXILLA.

Modes of Reduction differ.—The means employed for the reduction of the head of the humerus when dislocated downwards into the axilla, must differ according to the circumstances attending the accident; but in all recent cases, I generally attempt the reduction by the heel in the axilla, which may be done in the following manner:—

By the Heel in the Axilla.—The patient should be placed on a sofa, or table, near the edge, in a recumbent posture, and a wetted roller should be bound round the arm, just above the elbow, over which a handkerchief or towel should be fastened; the elbow being then separated from the side, the surgeon places the heel of one foot in the axilla, and rests the other upon the ground, as he sits by the patient's side. The heel should be placed far enough back to receive the inferior edge of the scapular, and prevent its descent at the time the arm is extended. The extension is to be made from the handkerchief or towel, and continued steadily for four or five minutes, in which time usually the head of the bone slips into its proper cavity. The force of two or more persons may be employed in extending, by means of the towel, if required.

If of some standing.—If, however, the accident is of several days' standing, and if the muscles have been fixed and rigid, more force than can be applied as above will be required to effect the reduction, and the following means must be resorted to:—

Second Mode.—The patient must be placed in a chair, and the scapula fixed by a bandage with a slit in it, which admits the arm through it; this must be tied over the acromion, so as to keep it well in the axilla. Next, place a wetted roller round the arm immediately above the elbow to protect the skin, and upon it fix a very fine worsted tape, by what is termed the clove-hitch. Then raise the arm at right angles with the body, or a little above the horizontal line, to relax the deltoid and supra spinatus muscles. Two persons then holding the scapula bandage should keep it fixed, whilst two others draw from the bandage affixed to the arm with a steady, equal, and combined force. After the extension has been kept up for a few minutes, the surgeon should place his knee in the axilla, resting his foot on the patient's chair; he should then raise his knee by extending his foot, and at the same time, with his right hand, push the acromion downwards and inwards, by which the reduction will be generally accomplished.

Whilst the extension is kept up, a gentle rotatory motion will diminish

the counteracting power of the muscles, and materially expedite the reduction ; but should the force applied in this way not be sufficiently steady and continued, then we must apply the pulleys, not with a view of exerting greater force, but to enable the surgeon to employ it more equally and gradually.

Use of Pulleys.—The bandages, &c., being applied, as in the last instance, the patient is to be seated between two staples, which are to be fixed in the walls of the apartment, so that the force can be employed in the same direction as before-mentioned. The surgeon should first draw gently and steadily until the patient complains of pain, when he should stop, but not relax the extension. Much advantage may be gained now by conversing with the patient, and directing his attention to indifferent subjects. In two or three minutes he may carefully extend a little more, and then cease again, and so on until he has made as much extension as he thinks correct, but he should at intervals slightly rotate the limb. Then giving the string of the pulley to an assistant, desiring him not to relax, he should place the knee in the axilla, and press the acromion as before described, when the bone glides into its proper situation, not however with a snap, as when the other means are employed.

Hospital Treatment.—In the hospital practice, I usually order the patient to be bled, and put into a warm bath at the temperature of 100° to 110°; giving him a solution of tartar emetic until he becomes nauseated and faint, when he is immediately taken from the bath, and extension applied before he regains muscular power. This plan obviates the necessity of using any great force.

By the Knee in the Axilla.—In very old relaxed persons, or in very delicate females, another mode of reducing this dislocation may be resorted to by placing the knee in the axilla in the following manner :—The patient should be seated upon a low chair, when the surgeon should separate the injured arm from the side, and then resting his foot upon the chair should place his knee in the axilla, and holding the arm with one hand over the condyles of the humerus, and pressing the acromion of the scapula with the other, he should then depress the elbow, by which the dislocation will be reduced.

When often Dislocated, easily Reduced.—*Case.*—After frequent displacements of the shoulder, but very slight force is necessary to reduce any future dislocations. A gentleman in the country, of my acquaintance, who has frequently dislocated his shoulder, has often reduced it himself in the following way,—by leaning over one of the common field gates, and laying hold of one of the lower bars, then allowing his body to weigh down on the other side ;—this is on the same principle as placing the heel in the axilla, which effect the reduction of three-fourths of the recent dislocations.

OF DISLOCATION FORWARDS UNDER THE PECTORAL MUSCLE.

Easily detected.—This dislocation is much more readily detected than the former. The depression beneath the acromion process of the scapula is greater, and the process itself appears more prominent. The head of the os humeri can be distinctly felt, and, in thin persons, may be seen forming a swelling beneath the clavicle, which moves when the elbow is rotated.

Signs of.—The head of the bone is situated internal to the coracoid process, between it and the sternum, and is covered by the large pectoral muscle. The arm is shortened, and the elbow is separated from the side, being forced outwards and backwards; the motions of the arm are more affected than in the former dislocation, the head of the bone being fixed, by the coracoid process and neck of the scapula on the outer side, by the clavicle above, and by the muscle on the fore part, as well as by the action of the teres minor with the supra and infra spinati muscles, which are rendered very tense.

The pain occasioned by this injury is not so severe as in the dislocation into the axilla, because the axillary vessels and nerves are less compressed.

Chief Marks.—The chief diagnostic marks, are the position of the limb, the elbow being carried from the side and backwards; the head of the bone being readily felt below the clavicle, and its moving when the arm is rotated.

Dissection of.—There is in the Museum at St. Thomas's Hospital, a beautiful preparation, showing a dislocation of this kind of long standing, which presents the following appearances:—The head of the humerus rests upon the neck and part of the venter of the scapula, just below the supra-scapular notch; the subscapularis muscle has in part been raised, so that the head of the bone rests on the scapula; the subscapularis and serratus magnus muscles being between the extremity of the humerus and the surface of the ribs. The tendons of all the muscles attached to the tubercles, as also that of the long head of the biceps muscle, remain perfect. The glenoid cavity is filled with a ligamentous substance, but its general figure is not much altered; and to this ligamentous structure the tendons of the supra and infra spinati, and of the teres minor muscles are adherent, having however a sesamoid bone formed in them: a new socket has been formed, which extends from the glenoid cavity, to the venter of the scapula, occupying about one third of its width; it has a complete lip, and is irregularly covered with cartilage; the head of the humerus is a good deal altered in form, and its cartilage has been in many places removed by absorption: a perfect capsular ligament has been formed.

Causes.—Violent blows upon the shoulder, or falls upon the elbow, when it is thrown behind the line of the body, are the usual causes of this dislocation.

OF THE REDUCTION OF THE DISLOCATION FORWARDS.

When Recent.—In recent dislocations of the kind, the reduction may be accomplished by placing the heel in the axilla, and making extension from the arm as before described ; the foot should, however, be placed rather more forwards, to press on the head of the bone, and the arm should be drawn a little backwards as well as downwards.

When of Long Standing.—When the dislocation has existed for some days, it will be best to use the pulleys, as continued and steady extension will be required to reduce it.

Mode of Reduction.—The scapula must be fixed by the same bandage as formerly described, and the wetted roller, with a strap for the pulleys, fixed on in the same manner above the elbow. The fore-arm should be bent to relax the biceps muscle.

Direction of Extension.—The most important circumstance, is the direction in which the extension is to be made, which must be outwards, a little downwards and backwards ; for if it be made horizontally, as in the former case, the coracoid process of the scapula prevents the head of the humerus from passing outwards in its proper situation.

When the head of the bone has been brought below the coracoid process, by the extension, the surgeon should, with his knee, press it backwards and upwards to the glenoid cavity, at the same time pulling the arm forwards from the elbow, by which means he will expedite the reduction. As the resistance is greater, the extension must generally be continued longer than that required to reduce the dislocation into the axilla.

OF THE DISLOCATION BACKWARDS ON THE DORSUM OF THE SCAPULA.

Situation of Bone.—In this dislocation, the head of the humerus is thrown upon the dorsum of the scapula, below the spine, where it forms a projection at once perceptible to the eyes of the surgeon, and this enlargement may be seen and felt to move when the elbow is rotated. The motions of the arm are less confined than in either of the former dislocations.

Very rare.—Only two cases of this kind have occurred in Guy's Hospital during thirty-eight years. One was during my apprenticeship, and was under the care of Mr. Forster. The nature of the injury was scarcely to be mistaken, on account of the projection formed by the head of the bone upon the posterior part of the scapula. The bandages were applied, and the extension made in the same way as for the dislocation into the axilla, and the reduction was quickly accomplished.

The second case was reduced in the same manner by the dresser : it occurred some years after the former.

OF PARTIAL DISLOCATION OF THE OS HUMERI.

Of common Occurrence.—This is an accident of frequent occurrence. The head of the humerus is displaced forwards, and rests against the coracoid process of the scapula; there is a depression under the back part of the acromion, the axis of the arm is directed inwards and forwards, and the under motions of the arm can still be made, but it cannot be elevated as the head of the bone strikes against the coracoid process, over which it forms an evident projection, moving when the arm is rotated.

Case.—Mr. Brown, aged fifty, was thrown from his chaise and injured his shoulder, which upon examination was found to have lost its roundness, and a depression was perceptible under the acromion process; the arm could be moved readily, except directly upwards.

The only opportunity which I have had of seeing the dissection of this accident, was through the kindness of Mr. Paty, surgeon, Bouverie Street; he had the subject brought to him for dissection at St. Thomas's Hospital.

The following is Mr. Paty's account:

Mr. Paty's Dissection of.—Partial dislocation of the head of the os humeri, found in a subject brought for dissection to St. Thomas's Hospital, during the latter part of the year 1819.

The appearance were as follows:—The head of the os humeri on the left side, was placed more forwards than is natural, and the arm could be drawn no further from the side, than the half-way to the horizontal position.

Dissection.—The tendons of those muscles which are connected with the joint were not torn, and the capsular ligament was found attached to the coracoid process of the scapula. When this ligament was opened, it was found that the head of the os humeri was situated under the coracoid process, which formed the upper part of the new glenoid cavity; the head of the bone appeared to be thrown upon the anterior part of the neck of the scapula, which was hollowed, and formed the lower portion of the new glenoid cavity. The natural rounded form of the head of the bone was much altered, it having become irregularly oviform, with its long axis from above downwards; a small portion of the original glenoid cavity remained, but this was rendered irregular on its surface, by the deposition of cartilage; there were also many particles of cartilaginous matter upon the head of the os humeri and upon the hollow of the new cavity in the cervix scapulæ, which received the head of the bone. At the upper and back part of the joint, there was a large piece of the cartilage, which hung loosely into the cavity, being connected with the synovial membrane at the upper part only by two or three small membranous bands. The long head of the biceps muscle seemed to have been ruptured near to its origin, at the upper part of the glenoid cavity; for at this part the

tendon was very small, and had the appearance of being a new formation.

Causes of.—The same causes which produce the dislocation under the clavicle, only with less violence, will occasion this displacement.

Reduction of.—The reduction in these cases may be accomplished by the same means as those directed to be employed for the dislocation forwards; but in addition, it is necessary to draw the shoulders backwards, and after the reduction, a bandage must be applied to keep the head of the bone in its proper situation, and to prevent the motions of the scapula forwards, or otherwise the bone will again slip out of the glenoid cavity.

OF COMPOUND DISLOCATION OF THE OS HUMERI.

Forwards.—In the dislocation of the os humeri forwards, the head of the bone may, by excessive violence, be forced through the exterior soft parts.

Treatment of.—In such a case, the reduction of the displaced bone should be immediately effected by the means I have already recommended for the simple dislocation; and when replaced, the edges of the external wound should be approximated by a suture, and then lint dipped in blood should be applied over the wound, which is to be further supported by strips of adhesive plaster. The limb must be fixed to the side, by a roller passed round it and the body; this will prevent any motion of the limb, and thus there will be less risk of the suppurative inflammation occurring, which would greatly endanger the patient's life.

Mr. Dixon's Case.—Mr. Dixon, of Newington, kindly furnished me with the following particulars of a case which was under his care:—

Robert Price, aged fifty-five, fell, when in a state of intoxication, upon his shoulder, which produced a dislocation of the humerus, and forced the head of the bone forwards, through the integuments of the axilla; and I found it situated on the anterior part of the thorax, over the large pectoral muscle. The reduction was accomplished with great ease, after which he was placed in bed, and an evaporating lotion was applied. The following morning he complained of great pain, and considerable swelling had taken place; for this he was bled and purged freely, the injured part was poulticed, and anodynes were given to relieve pain and procure rest. For several days afterwards, leeches were repeatedly and freely applied over the joint, until after about two weeks from the receipt of the injury, when the wound began to discharge very freely a healthy pus. This continued for ten or twelve weeks, during which time his constitution suffered much, he was restless, irritable, and became emaciated. Afterwards, a number of small abscesses formed in the surrounding cellular tissue, occasioning sinuses, some of which were exceedingly troublesome, requiring dilatation. This was kept up for twelve months, when all discharge ceased, but

the joint was completely ankylosed. He retained, however, perfect use of the fore arm and hand.

OF INJURIES NEAR THE SHOULDER JOINT LIABLE TO BE MISTAKEN FOR DISLOCATIONS.

Fracture of the Acromion.

Signs of.—When this process of bone is broken off, it is drawn down by the weight of the arm, the deltoid muscle having in part lost its support, allows the head of the os humeri to sink as far as the capsular ligament will admit of its doing so, and the roundness of the shoulder is consequently destroyed. On tracing the finger along the spine of the scapula, towards the acromion, a depression is felt at the point of natural junction between these two parts. If the arm be raised from the elbow, so as to carry the head of the humerus upwards, the shape of the shoulder is immediately restored, as the acromion process is returned to its original position, but as soon as the arm is allowed again to hang down, the deformity recurs; when the arm has been elevated, a crepitus may be distinctly felt, by pressing one hand over the seat of injury, and at the same time rotating the elbow.

Treatment of.—In the treatment of this accident, the os humeri is to be made the splint, to keep the fractured bone in its proper position; and to effect this, the elbow is to be raised, and the arm fixed, but a thick pad or cushion must be placed between the elbow and side, to separate the former from the latter, and thus relax the deltoid muscle, otherwise the broken extremities of the bone will not be in contact. The pad having been placed between the side and elbow, the arm should be bound firmly to the chest by a roller, and a second bandage, or a short sling should be applied to support the elbow, and this position should be maintained for three weeks.

Union by Ligament.—Very little inflammation usually follows this injury, and the disposition to ossific union is very feeble; thus, unless the fractured ends of the bone be placed in close contact, and if they be not kept perfectly at rest during the time required for such union, the junction will be by a ligamentous structure, instead of by bone.

FRACTURE OF THE NECK OF THE SCAPULA.

Like Dislocation.—This accident is much more likely to be confounded with dislocation than any other of the injuries to the shoulder joint. The fracture takes place through the narrow part of the neck of the scapula, opposite the notch of the superior costa; and the glenoid cavity falls with the head of the humerus into the axilla. The rotundity of the shoulder is therefore destroyed, a hollow exists below the

acromion process; and the head of the os humeri can be felt in the axilla, as when the dislocation into the axilla occurs.

Signs of.—In these cases the deformity of the shoulder is easily removed by raising the arm; but when the support is withdrawn, the appearances of dislocation again present themselves; and by grasping the shoulder so that the fingers rest upon the coracoid process, a distinct crepitus may be felt when the arm is rotated. Thus the ease with which the form of the shoulder is restored, the re-appearance of dislocation when the support is withdrawn; and the perception of crepitus in the situation of the coracoid process, are the principal diagnostic marks of the fracture of the neck of the scapula.*

Treatment.—In the treatment of this injury, two principal points must be attended to. First, to elevate the head of the humerus; and, Secondly, to carry it outwards; the latter object will be effected by

*The above account is that which I have given for many years in my lectures, and which I thought fully to explain the nature of the symptoms attending this accident, although it had never been confirmed by any subsequent dissection of the parts.

Two cases have lately offered themselves, in which I have had opportunities of carefully examining the shoulder joint, after the receipt of injuries, which, at the time, produced the above described symptoms, and which had been considered as fractures of the cervix scapulæ.

The first case was that of a Mr. B. a West India merchant, who, at my request, bequeathed to me the joint in which this accident was supposed to have occurred; his executors resisted my claim, but after some little difficulty I obtained my legacy. On exposing the cavity of the axilla, I there found the head of the os humeri separated from the shaft of the bone; it was seated just below the cervix of the scapula, and was united by a ligamentous matter to the venter of the scapula, close to the anterior costa. The fracture had taken place between the articular surface of the humerus, and its tubercles; the capsular ligament had been lacerated, so as to permit the separated portion to escape into the axilla; and the upper part of the shaft of the bone with the tubercles, had fallen in upon the glenoid cavity, by which the roundness of the shoulder had been destroyed; the glenoid cavity was but little altered, and the patient had before his death, acquired a free motion of the joint in every direction, excepting as a sword arm, for he could not raise his elbow above the horizontal line. The parts are preserved in the museum at St. Thomas's Hospital.

In the second, that of a gentleman in Gainsford Street, a patient of Mr. Greenwood's, in whom a fracture of the cervix scapulæ was supposed to have occurred, and who died in consequence of retention of urine, I discovered, on inspecting the injured joint, nearly the same appearances as in the former dissection.

Having thus ascertained the true nature of this injury, by the only accurate mode, viz., that of dissection, I have since been able readily to trace it in the living subject.

Mr. B. the medical attendant of Lord Y. whilst travelling with his lordship in the Isle of Wight, had his shoulder injured in consequence of the carriage being overturned. Sometime after I saw him in London, in consultation with several medical gentlemen, and on examining the shoulder I found a depression beneath the acromion process; and could distinctly feel the head of the humerus in the axilla. The rotundity of the shoulder could be easily restored by elevating the arm so as to carry the upper portion of the bone upwards and outwards; but whilst the humerus was supported in this position, could still plainly feel the head of the humerus in the axilla, separated from the shaft of the bone.

I must confess, that I now doubt the very frequent occurrence of the fracture of the cervix scapulæ.

putting a thick compress on the axilla ; and the former, by elevating the arm and confining it in a short sling.

OF FRACTURE BELOW THE TUBERCLES OF THE HUMERUS.

Rare in Middle Aged Persons.—This injury sometimes occurs in the young and old, but rarely in the middle aged. In the young the separation takes place between the epiphysis and shaft of the bone, and in the old, near the same spot, from the weakness of bone at that part. In these cases, the head of the humerus remains in the glenoid cavity, but the body of the bone sinks into the axilla, drawing down the deltoid muscles so as to lessen the roundness of the shoulder.

Case.—I made the following notes respecting the case of a child about ten years of age, brought into Guy's Hospital with this injury. The limb could not be moved without creating great pain : if the upper part of the bone was fixed, the lower portion could be tilted out so as to be felt, and to form a visible projection, and in doing this a crepitus was distinctly perceived, which could not be felt whilst the bone remained depressed into the axilla. The head of the humerus did not obey the rotatory motions of the elbow.

Treatment.—In treating this accident, a roller should be applied from the elbow to the shoulder ; and then a splint must be placed on the inner, and another on the outer side of the arm, with proper pads, and these must be fixed on with tapes, or a roller. A cushion should be put in the axilla, to throw out the upper part of the bone, and the limb should be gently supported in a sling, but not at all forced up, or the bones will overlap.



LECTURE XLII.

DISLOCATIONS OF THE ELBOW-JOINT.

THE elbow may be dislocated in five different ways.

- 1st. The ulna and radius backwards.
- 2d. The ulna and radius laterally.
- 3d. The ulna separately from the radius.
- 4th. The radius alone forwards.
- 5th. The radius alone backwards.

OF DISLOCATION OF THE ULNA AND RADIUS BACKWARDS.

Signs of.—This injury is strongly marked by the great change in the figure of the joint, and by the destruction of its principal motions.

The ulna and radius form a considerable projection above the natural position of the olecranon posteriorly, with a depression on each side ; on the fore part, the extremity of the humerus occasions a swelling behind the tendon of the biceps muscle. The flexion of the joint is almost destroyed, and the fore arm and hand are fixed in a supine position.

In the museum at St. Thomas's Hospital is a preparation showing the effects of a compound dislocation of this kind, which I had an opportunity of dissecting.

Dissection of.—The olecranon projected one inch and a half above its usual position, posteriorly, and the coronoid process of the ulna rested in the posterior fossa of the humerus ; the radius was thrown upon the back part of the external condyle of the humerus ; the condyles themselves formed a large swelling anteriorly. The capsular ligament was lacerated extensively on its fore part, but the coronary ligament remained entire. The brachialis anticus muscle was greatly stretched, and the biceps moderately so, by the altered position of the radius and ulna.

Cause.—The mode in which this accident is produced is by a severe fall, when the person puts out the hand to save himself ; but the whole weight of the body being received upon the limb before it is perfectly extended, the radius and ulna are forced backwards and upwards behind the humerus.

Mode of Reduction.—The reduction of this dislocation may be readily accomplished by the following means. The patient being seated on a chair, the surgeon should lay hold of his wrist and place his knee on the inner side of the elbow joint, then pressing down the ulna and radius with his knee, so as to separate them from the humerus ; he should at the same time bend the arm gradually and firmly ; the coronoid process is thus removed from the posterior fossa of the humerus, and the action of the muscles draws the bones into their proper situations. Bending the arm around a bed post, or over the back of a chair, will also effect the reduction.

After-treatment.—After the reduction the arm should be bandaged in the bent position, at rather less than a right angle with the upper arm ; the bandage should be kept wet with an evaporating lotion, and the limb supported by a sling.

OF DISLOCATION OF THE ULNA AND RADIUS Laterally.

External or Internal.—This dislocation may take place either externally or internally ; in one case the ulna is thrown upon the external condyle of the humerus, and in the other instance, upon the internal condyle.

Signs of External.—In the external displacement, the olecranon forms a greater projection than in the dislocation backwards, as its coronoid process is seated upon the external condyle of the humerus, instead of being placed in its posterior fossa ; the head of the radius is thrown

to the outer side, and behind, where it forms a swelling, which moves when the hand is rotated.

Of Internal.—When dislocated internally, the olecranon projects equally as in the former case, but the head of the radius falls into the posterior fossa of the humerus; the external condyle forms a large protuberance of the outer side.

Cause.—This accident is produced in the same way as the former, only that the direction of the limb at the time varies.

Reduction.—The reduction in these cases may be affected by the method described as proper for the dislocation backwards; it is not necessary to move the fore-arm outwards or inwards, as the actions of the biceps and brachialis anticus muscles draw the bones into their natural positions, immediately that they are separated from the extremity of the humerus.

Case.—In a recent case of this dislocation in a lady, I speedily reduced it by forcibly extending the arm; when the tendons of the biceps and the brachialis anticus muscles acted as strings from a pulley, and forced the condyles of the humerus backwards.

OF DISLOCATION OF THE ULNA BACKWARDS.

Signs of.—When the ulna is thrown backwards upon the os humeri, and the radius remains in its natural situation, the olecranon forms a projection behind, and the fore-arm and hand are twisted inwards. The fore-arm cannot be brought to more than a right angle with the upper arm, without considerable force.

It is not so readily detected as the former injuries; but its chief diagnostic marks are the projection of the ulna, and the turning of the fore-arm inwards.

Dissection of.—A preparation in the museum at St. Thomas's Hospital affords an excellent opportunity of viewing the nature of this dislocation. The displacement had existed for a long time unreduced. The coronoid process of the ulna rests in the posterior fossa of the humerus; the olecranon projects behind; the head of the radius has made a considerable depression in the external condyle. The coronary, oblique, and a small portion of the interosseous ligaments have been torn through.

Cause.—This dislocation is produced by the application of violence in the direction of the lower extremity of the ulna, which forces it suddenly upwards and backwards.

Reduction of.—The reduction is in this case much more readily made than when both bones are displaced, and by the same means. The radius assists the return of the ulna to its proper position, by pushing the condyles back, when the fore-arm is bent, and the brachialis anticus acts at the same time in drawing the ulna forwards.

OF DISLOCATION OF THE RADIUS FORWARDS.

Situation of Bone.—The radius is sometimes separated from its attachment to the coronoid process of the ulna, and is displaced into the depression above the anterior part of the external condyle of the humerus, and also above the coronoid process.

Signs of.—I have seen several cases of this injury, which exhibits the following marks. The fore-arm is a little bent, but cannot be either completely flexed or extended. When an attempt is made to bend the fore-arm, the motion is suddenly stopped by the striking of the radius against the humerus, and the surgeon is immediately convinced that this check to the flexion is by the striking of one bone upon another. The hand is nearly in a state of complete pronation, but cannot be rendered entirely so, nor can it be placed in a supine position. The head of the radius may be felt on the fore and upper part of the elbow joint, and its movements are perceptible when the hand is rotated.

The sudden stop to the flexion of the fore-arm, and the situation of the head of the radius are the most distinguishing marks of this injury.*

Dissection of.—On dissecting this injury, the head of the radius is found resting in the depression above the external condyle of the humerus. The coronary, the oblique, with part of the interosseous, and the anterior portion of the capsular ligaments are lacerated. The biceps muscle is shortened.

Cause.—The dislocation is occasioned by a fall upon the hand when the limb is fully extended, the weight of the body being received upon the inferior extremity of the radius.

Cases.—The first case I had an opportunity of seeing of this accident, occurred under the care of Mr. Cline, during my apprenticeship to him, at St. Thomas's Hospital. The most varied attempts, which his strong judgment could suggest, were made to reduce the displacement, but without success; and the woman was discharged with the bone still displaced.

The second case which I witnessed was in a lad, whom I was asked to visit by Mr. Balmanno, in Bishopsgate Street; but I could not succeed in reducing the dislocation, although I persevered, with varied modes of extension, for more than an hour and a quarter.

In the third case, I succeeded in replacing the bone during the time

* A sailor about thirty years of age, applied at St. Thomas's Hospital with a dislocation of the radius forwards, which had existed above six months. I could readily feel the head of the radius above the external condyle, particularly when I bent the arm as much as possible, and flexed the hand towards the fore-arm. The hand was half supine, and could not be placed entirely in the supine or prone positions, if the humerus was fixed. A sudden stop was experienced when bending the arm, by the head of the radius striking upon the humerus. The man had regained a great degree of motion, yet was extremely anxious for me to attempt the reduction, which I declined, and urged him not to allow any one to make the trial, as I was confident it would have been useless.—T.

that the patient was in a state of syncope ; by resting his olecranon upon my foot, (as he lay upon the floor,) to prevent the ulna from receding, and then extending the fore-arm.

Another case which I attended with Mr. Gordon, was reduced by placing the arm over the back of a sofa, thus fixing the humerus, whilst we made extension from the hand so as to act alone on the radius.

Best Mode of Extension.—One evening after I had lectured upon this subject, and had explained the difficulties of reduction, Mr. Williams, one of my pupils, told me that he had known this dislocation reduced by extending the hand only. This I soon convinced myself was correct, by experiments, on the dead body. The connexion of the hand with the radius, allows of the application of force to extend this bone without including the ulna. In making the extension the humerus should be fixed, and the hand rendered as much as possible supine, to remove the head of the radius from the upper part of the coronoid process of the ulna.

OF DISLOCATION OF THE RADIUS BACKWARDS.

Very rare.—The only instance in which I have seen this dislocation, was in a subject brought to St. Thomas's dissecting-room, in the year 1821 ; the displacement had existed some time.

Signs of.—The head of the radius was thrown behind, and to the outside of the external condyle of the humerus, where it formed a projection which could be readily seen as well as felt, when the arm was extended. The oblique and coronary ligaments were torn through, and the capsular ligament was partially lacerated.

Of the cause of this accident I am ignorant, as I have never seen it in the living subject.

Reduction.—The reduction, I should imagine, would be easily effected by bending the arm, after which it would be proper to support the bone in its proper position, by means of bandages, and keep the arm bent at right angles, for three or four weeks, until the ligaments have had time to unite.

ACCIDENTS AT THE ELBOW JOINT LIKELY TO BE CONFOUNDED WITH DISLOCATIONS.

Fracture above the Condyles of the Humerus.

Like the Dislocation backwards.—When the condyles of the os humeri are obliquely fractured a little above the elbow joint, the appearances presented are so like to those occurring from the dislocation of the ulna and radius backwards, that the two injuries might be readily confounded ; in the fracture, however, all marks of dislocation are easily removed by extension, but return again as soon as the extension

is withheld, and by rotating the fore-arm upon the humerus, a distinct crepitus can be usually felt.

Case.—In July, 1822, a boy about nine years of age was admitted into Guy's Hospital, having fallen from a cart upon his elbow. The arm was a little bent, and the ulna and radius appeared to form a large projection behind the elbow joint: when the fore-arm was extended, the appearances of dislocation subsided, but they returned immediately that the extension was discontinued. The arm was secured in splints, which were removed in ten days, when passive motion was carefully employed; the lad recovered.

Frequent in Children.—This injury is much more frequently met with in children than adults; but I have known it to occur at nearly all ages.

Treatment.—In treating this accident, the arm should be bent, and the fore-arm drawn forwards to replace the fractured portions, and should be then secured by a bandage.

A splint having two portions joined at right angles, is best adapted to this case; the upper portion is to be placed behind the upper arm, and the lower part under the fore-arm; a splint will be also required on the fore-part of the upper arm; these should be well secured by straps, the arm should be supported by a sling, and evaporating lotions kept applied.

Passive Motion.—After the lapse of a fortnight in the young patient, and of three weeks in the adult, passive motion should be carefully employed to prevent ankylosis, which may otherwise take place. In some of these cases, the loss of motion in the joint is considerable, even after the greatest care and attention on the part of the surgeon.

OF FRACTURE OF THE INTERNAL CONDYLE OF THE HUMERUS.

Signs of.—When this accident occurs the ulna projects backwards, from having lost its support. The injury may be distinguished from others by the crepitus, which can be felt upon bending and straightening the arm, and from the hand being turned towards the side during the extension.

Treatment.—The same mode of treatment as that directed for the fracture above the condyles, will be proper in this case; passive motion must be employed early, when the recovery will be complete.

OF FRACTURE OF THE EXTERNAL CONDYLE OF THE HUMERUS.

Signs of.—This injury produces swelling over the external condyle, and pain is experienced at the part on pressure, or during the flexion and extension of the arm; but it is best distinguished by the crepitus, which can be readily felt during the rotatory motions of the hand. If

the portion of bone detached be large, it is displaced backwards, and the head of the radius accompanies it.

Dissection of.—Two preparations in the museum at St. Thomas's Hospital, exhibit specimens of this fracture; one is oblique, and the other transverse at the extremity of the condyle. There is not any ossific union in either, but the fractured portions are joined by a ligamentous substance, and this appears to be the case in all instances of fracture with a capsular ligament.

Frequent in Children.—Children are generally the subjects of this accident; it is seldom met with in adults, and very rarely in advanced age; and it is occasioned usually by a fall upon the elbow.

Treatment.—The best mode of treatment in this injury, is to place a roller around the joint, which should pass also above and below it, then to support the limb in the splint, having two portions at right angles, as in fracture above the condyles; and to this, the upper and lower arm are to be well secured. In young children, a portion of stiff paste board, applied wet, and bent to the shape of the elbow, will answer best, as when dry it adapts itself to the form of the limb, and affords an excellent support.

Passive Motion.—After three weeks, the surgeon should very cautiously commence the passive motion.

Bony Union.—If the fracture in these cases extends without the capsular ligament, a bony union may with care be effected; but when entirely within the capsule, the union, as far as I have seen, is always ligamentous.

OF FRACTURE OF THE CORONOID PROCESS OF THE ULNA.

The following case which I have for many years related in my lecture, was considered as a fracture of the coronoid process, and will show the symptoms produced by such an injury.

Case.—A gentleman in the act of running, fell upon his hand, which he extended to break his fall, and immediately afterwards he discovered that the motions of his elbow joint were greatly diminished, as he could bend the arm but little, nor could he entirely straighten it. His medical attendant in the country, to whom he applied, found the ulna projecting backwards, but that on forcibly bending the arm, the figure of the joint became immediately restored. A splint and bandages were applied, and the arm supported by a sling. Several months afterwards the gentleman came to town, when I saw him; his ulna still projected behind the condyles of the humerus; but could with little violence be restored to its situation by bending the arm.

Union Ligamentous.—*Case.*—Some time after I had seen this gentleman, I had an opportunity of dissecting a case of this injury, in a subject brought to St. Thomas's anatomical theatre. The coronoid process of the ulna had been broken off within the joint, and had only

united by ligament, so as to move freely on the ulna, and to allow the ulna to be carried back between the condyles, when the arm was extended.

Reason of.—I am doubtful if the most careful treatment would effect a perfect cure, as the coronoid process loses its ossific nourishment, and has only a ligamentous support. The vitality of the fractured process of bone is only supported by the vessels of the reflected portions of the capsular ligament, which do not appear sufficient to create a bony union.

Treatment.—In the treatment of this accident, the arm should be kept steadily in the bent position for three weeks, to allow time for the ligamentous union, and to make it as short as possible.

OF FRACTURE OF THE OLECRANON.

Signs of.—The marks of the injury are generally so violent, that it can scarcely be mistaken. A swelling takes place at the back of the elbow, which, when pressed, feels soft, and allows the finger to sink in towards the joint; this is between the two extremities of the fractured bone; the detached portion is drawn upwards from the head of the ulna, to the extent of from half an inch to two inches; it can be readily moved from side to side beneath the integument, and becomes further separated from its former connexion when the arm is bent. The patient can bend the arm with ease, but he cannot extend it without great difficulty, and the attempt gives him much pain; without exertion it remains semiflexed. No crepitus can be felt; and the rotatory motion of the radius upon the ulna are perfect. Considerable tumefaction from effusion of blood usually follows this accident, and in a few days the surrounding parts are much discoloured from ecchymosis. The fracture generally occurs about the centre of the process, transversely; but I have seen the bone obliquely fractured.

Dissection.—In dissecting the injured parts, some time after the occurrence of the accident, the portion of the olecranon, still connected to the ulna, exhibits some evidence of ossific deposit, and sometimes the detached part has some slight marks of a similar character; the cancellated structure is filled with new ossific matter. The capsular ligament is lacerated posteriorly on each side of the olecranon. It appears, therefore, that as soon as the fracture takes place, the action of the triceps muscle draws up the extremity of the process, from half an inch to two inches, according to the extent of laceration of the capsular ligament, and the ligamentous band naturally connecting the olecranon to the coronoid process.

Experiments.—To satisfy myself whether this process when broken would again unite by bone, I tried several experiments upon dogs and rabbits, when I found that if the fracture was transverse, and such as to allow of separation between the fractured ends, by the action of the muscles, the union was always ligamentous; but if the fracture was oblique, and not admitting of separation, the parts were readily united by ossific deposit. The want of bony union, appears, therefore, to de-

pend upon a want of adaptation of the broken surfaces, and not upon any deficiency of support, as in the case with the fractures of processes within the capsular ligaments of joints.

Causes.—This fracture may be occasioned by falling upon the elbow, when the arm is bent, or it may take place from the action of the triceps muscle only, during any violent and sudden exertion.

Treatment.—The principle of treatment in these cases is to render the separation of the fractured extremities of the bone as slight as possible, as the limb is weakened in proportion to the length of the ligamentous union, from the diminished power of the triceps muscle. The arm, if possible, should be placed and fixed in a straight position, and if much swelling and pain exist, leeches and evaporating lotions must be employed for two or three days; and immediately the tumefaction has subsided, a bandage must be applied above the elbow, and another below, having a portion of linen or broad tape placed beneath them longitudinally on each side of the joint; the ends of these pieces of linen or tapes are then to be tightly tied over the rollers, so as to approximate them, and thus bring the broken surfaces together. A splint well padded must be placed on the fore part of the arm and joint, and confined by rollers, so as completely to prevent any flexion of the limb. The bandages about the seat of injury should be kept wetted with the evaporating lotion.

This is the only injury to the elbow joint, in which the straight position is proper.

Passive Motion.—Passive motion should be very carefully employed about a month after the accident, but not sooner.

When Compound.—When this fracture is compound, union by adhesion should be effected if possible, by approximating the edges of the external wound with adhesive plaster, and placing over this, lint dipped in blood: the treatment in other respects, will be the same as in the simple injury.

FRACTURE OF THE NECK OF THE RADIUS.

Very rare.—This injury, which is said by some surgeons to be of frequent occurrence, I have never seen; but I do not mean to deny that it sometimes happens.

When it exists, I should imagine that it would be readily detected by the crepitus, which the rotating of the radius would occasion.

Treatment.—The same mode of treatment as that already recommended for fracture of the external condyle, would in such cases be most proper.

OF COMPOUND FRACTURES, AND DISLOCATIONS OF THE ELBOW JOINT.

Not Dangerous.—I have known several cases of this nature recover, with a partial ankylosis of the joint; if properly treated, the

constitutional derangement in consequence of the injury, is not productive of any serious mischief.

Case.—A brewer's servant was admitted into Guy's Hospital on account of a compound fracture of his elbow joint, attended with considerable comminution of bone. The extent of injury was so great as to induce me recommend immediate amputation, but I could not by any means persuade the patient to submit to the operation. The limb was therefore placed upon a splint, in a bent position, the bones being easily reduced; the edges of the exterior wound were carefully approximated. He recovered without any untoward symptoms, and retained sufficient motion of the joint, to enable him to resume his former employment.

I have known several other cases in which the patients have recovered, without any severe constitutional sufferings.

Treatment.—In the treatment of this injury, the limb should be kept in a flexed position, as ankylosis to some extent is sure to be the consequence of it, when the position will lessen the inconvenience attending it. If attended with much comminution of bone, the loose portions should be removed before the external wound is closed. In elderly persons, or in those not possessing sufficient power of constitution to support the suppurative process, the limb should be amputated in the first instance. Otherwise, the edges of the wound should be brought together by adhesive plaster, then covered with lint dipped in blood, and afterwards supported by a bandage moistened with an evaporating lotion.

OF DISLOCATIONS OF THE WRIST JOINT.

Dislocations of this articulation may occur in three ways:—

First.—Dislocation of the ulna and radius together.

Second.—Dislocation of the radius alone.

Third.—Dislocation of the ulna alone.

DISLOCATION OF THE ULNA AND RADIUS.

Forwards or Backwards.—These bones may be displaced from the connexion with the carpal bones, either forwards or backwards. If a person in falling has the weight of the body received upon the palm of the hand, so as to occasion a dislocation, it will be forwards; the radius and ulna resting upon the anterior annular ligament of the carpus; should the fall, however, be upon the back of the hand, the contrary displacement may be produced.

Signs of.—In each of these cases, two projections are perceptible, anteriorly and posteriorly, one from the extremities of the radius and ulna, the other from the bones of the carpus, which render the detection of either injury easy.

Injury resembling Dislocation.—The effusion which so frequently follows sprains of the tendons, frequently produces an appearance somewhat similar to that resulting from dislocation ; it may, however, be distinguished from that occasioned by the dislocations, as it takes place gradually, and is rarely found on both sides,—whereas, in the displacement, the projections immediately follow the accident, and appear both anteriorly and posteriorly.

Reduction.—These dislocations may be easily reduced, by fixing the fore and upper arm, whilst extension is made from the hand ; immediately that the ends of the bones are separated from each other, the actions of the muscles restore them to their proper situations. When replaced, they must be supported by bandages, and two splints, one placed before and another behind the articulation, reaching from the elbow to the ends of the metacarpal bones, to prevent motion, as well as to protect the injured parts. The fore-arm and hand should be placed in a sling.

DISLOCATION OF THE RADIUS ALONE.

Forwards.—The radius is sometimes thrown from its articular surface anteriorly, so as to rest upon the scaphoid and trapezium, where it forms a projection ; the hand is twisted, the inner side of the palm being placed forwards.

Cause of.—A fall upon the hand, when it is bent back, is the common cause of this injury.

Reduction.—It may be reduced by the same means as the former dislocation, and will require the same after-treatment.

DISLOCATION OF THE ULNA ALONE.

Backwards.—The displacement of the ulna alone, occurs much more frequently than that of the radius alone ; the mode in which the former bone is articulated by means of an inter-articular cartilage, and its not forming a part of the wrist joint, allows of its being more readily thrown from its natural position. It usually projects backwards, and is attended with laceration of the sacciform ligament. It may be easily pressed into its proper situation, but immediately the pressure is discontinued, it again protrudes, as the support of the ligament is destroyed.

Treatment.—In the treatment of the injury, it is, therefore, necessary to employ a compress over the extremity of the ulna, and then to support the bone in its natural position, by bandages and splints, as in the former dislocation.

OF DISLOCATIONS OF THE ULNA, WITH FRACTURE OF THE RADIUS.

The ulna is often dislocated forwards, the radius being at the same time fractured obliquely about an inch above the articulation.

Signs of.—The hand is, in these cases, thrown backwards, as in the dislocation of both bones forwards; the extremity of the ulna can be felt just above the pisiform bone, beneath the tendon of the flexor carpi ulnaris, and the fractured extremity of the superior portion of the radius is situated under the flexor tendons of the hand.

Reduction.—The reduction in these cases is usually very difficult, requiring powerful extension; and there exists a further difficulty in preserving the proper position, when the reduction has been effected, as the bones are again displaced from the slightest cause, unless confined by bandages, &c. The extension should be made as in the former cases, and when the bones have been drawn into their natural situations, two cushions must be placed, one before and the other behind the articulation, and there firmly bound down by a roller; over these, splints, lined with pads, should be placed, to reach from the elbow to the hand, and secured by a long roller. The arm must be placed in a sling for three weeks, if the patient be young; or from four to five weeks if aged, before passive motion be resorted to for the purpose of restoring the motions of the joint, which will not be perfectly effected under four or five months.

OF COMPOUND DISLOCATION OF THE ULNA, WITH FRACTURE OF RADIUS.

Consequences.—The consequences of this injury are serious or not, according to the degree of surrounding mischief, and the extent of the fracture; if comminuted, the subsequent inflammation is severe, but otherwise of trifling extent, when judicious treatment is adopted.

Reduction.—The reduction is to be accomplished as when the simple dislocation and fracture occur; the edges of the wound must be carefully approximated, and every means taken to promote adhesive inflammation, and to keep it within bounds by evaporating lotions, and the employment of leeches if necessary. The arm must be laid on a splint, and supported by a sling. The dressings should not be disturbed so long as the patient remains free from suffering, or until the wound has united; should symptoms of suppuration occur, the removal of part of the dressings may be sufficient to allow the escape of the pus, without taking off the whole.

DISLOCATION OF THE CARPAL BONES.

Very rare.—This injury is of very rare occurrence.

Case.—An elderly woman was admitted into Guy's Hospital, in

consequence of an accident to her wrist, produced by a fall upon the back of her hand ; the radius was found to be fractured obliquely through its inferior extremity, and the part thus separated from the shaft of the bone, was thrown backwards upon the carpus with the scaphoid bone. The fingers could be extended, but not entirely flexed. The reduction was readily accomplished by extension and steady pressure, and the part supported by splints. Leeches and evaporating lotions were employed at first, to subdue the inflammation and tumefaction which followed the injury, and afterwards, further support was given by strips of soap-plaster.

Ganglia.—I have known ganglia, which so frequently form about this part, several times mistaken for displaced bones, but a little attention to the history of the case will readily explain the difference.

Partial Dislocation.—Relaxation of the carpal ligaments will sometimes admit of a partial dislocation of some of the bones, when the joint is forcibly flexed ; and this state is generally accompanied with great debility of the part, preventing the patient from any continued exercise of it.

Treatment.—Moderate pressure and support are the best means of relieving such complaints ; the use of friction and of cold water poured from a height upon the part, I have known of service.

OF COMPOUND DISLOCATION OF THE CARPAL BONES.

Causes.—This frequently happens from the bursting of guns, or from the hand and wrist being caught in machinery, and in such cases, one or two of the carpal bones may be removed, and a considerable degree of motion be afterwards preserved in the articulation ; but, if attended with extensive surrounding mischief, amputation should be performed.

Case.—The following case occurred under the care of Mr. Forster, in Guy's Hospital. Richard Mitchell, aged 22, was admitted into the Hospital in consequence of an extensive wound into the wrist joint, inflicted by a wool-combing machine. Two-thirds of the joint was opened, and the surrounding soft parts had suffered considerably. The scaphoid bone was dislocated backwards, and nearly separated from its usual connexions ; the extensor tendons of the thumb, of the fore and middle fingers were torn through, as was also the radial artery, which, however, did not bleed much. The scaphoid bone was removed, and the edges of the wound were approximated by sutures, and adhesive plaster applied in strips ; the whole was covered by lint dipped in blood, and supported upon a splint to prevent any motion of the joint ; a small quantity of blood was taken from the arm, and the seat of injury kept moistened with an evaporating lotion. In two or three days it became necessary to remove these dressings in consequence of suppuration, when a poultice was applied. A small slough which had formed, separated kindly, and the process of granulation went on with-

out a check, so as to fill the wound in the course of three weeks. His recovery was somewhat retarded by the occurrence of a pulmonary affection, requiring the use of leeches, diaphoretics, &c., to which it yielded. He left the Hospital, but with little motion of the fingers, but this appeared to be gradually increasing.

DISLOCATION OF THE METACARPAL BONES.

Articulation strong.—The articulation of these bones with the carpal is so strong, that great violence is requisite to separate them. I have seen them displaced from the bursting of guns or the passage of a heavy laden carriage over the hand.

Removal of Bones.—In these cases, one or more of the metacarpal bones may be removed without amputating the whole hand.

Cases.—I amputated the middle and ring fingers, with their metacarpal bones, from the hand of a Mr. Waddle, of Cheapside, in consequence of their being extensively injured by the bursting of a gun. I brought the edges of the wound together by sutures, and approximated the fore and little fingers by a roller; the wound united readily, and he had afterwards a very useful extremity.

A boy was admitted into Guy's Hospital with a very severe injury to the hand, from the bursting of a gun, by which all the metacarpal bones, excepting that of the fore-finger, were so shattered, as to render it impossible to save them. The thumb had been entirely separated, with its metacarpal bone, and the trapezium was so much injured, that I thought it proper to remove it; I therefore took it away, as well as the metacarpal bones of the middle, ring, and little fingers, with the fingers themselves; thus only leaving the fore-finger with its metacarpal bone. He recovered quickly, and could use this finger as a hook with the greatest facility and advantage.*

FRACTURE OF THE HEAD OF THE METACARPAL BONE.

Seat of.—The digital extremity of a metacarpal bone, which is called the head, is sometimes broken off, and gives rise to an appearance of dislocation, but the crepitus, on examination, makes the nature of the accident very evident.

Treatment.—In the treatment of this accident, the patient should be made to grasp a large ball of firm materials, and over this his hand

* A case somewhat similar to the above, occurred under my care in St. Thomas's Hospital, in which I was obliged to amputate the little and ring fingers from the injured hand, with their metacarpal bones. I also removed the unciform bone, and the middle finger, with two-thirds of its metacarpal bone. The recovery was gradual, but complete, and the patient can now use his thumb and fore-finger very expertly.—T.

should be confined by a roller ; this is the best method of restoring the fractured bone to its natural position.

DISLOCATIONS OF THE FINGERS.

Common Seat of.—The most frequent seat of this displacement is between the first and second phalanges ; but it is not an accident of common occurrence.

Nature of.—The dislocation may occur either backwards or forwards, when the projections formed by the ends of the bones plainly indicate the nature of the injury.

Reduction.—If recent, the reduction may be easily accomplished, by making extension with a slight inclination forwards, to relax the flexor muscles ; if of some days' standing, a long continued and steady extension is necessary to replace the bones. It has been recommended in cases of difficulty, to divide the ligaments or tendons, but I have seen too much mischief result from injuries to these parts, ever to advise such a practice.

Remarks apply to Injuries of the Toes.—The same observations are applicable to the dislocations of the toes, but rather more difficulty is experienced in the reduction, on account of the shortness of the phalanges.

OF DISLOCATION FROM CONTRACTION OF THE TENDON.

Cause.—The phalanges are sometimes drawn out of their proper positions by the contraction of a flexor tendon and its theca, in consequence of a chronic inflammation, induced by excessive employment of the hand in rowing, ploughing, hammering, &c. ; nothing can be done to relieve these cases, but when merely a single band of fascia is thickened, and produces this deformity, it may be divided with such advantage by a narrow bistoury, introduced by a small opening through the skin. A splint must afterwards be applied, to keep the finger straight during the healing of the wound.

In the Toes.—A similar contraction also occurs in the tendons of the toes from the wearing of tight shoes ; the projection of the first and second phalanges, in these cases, often gives rise to so much suffering and inconvenience as to make it necessary to amputate the toe, otherwise the patient cannot take necessary exercise, and is deprived of many enjoyments. The cases in which I have performed the operation, have generally done extremely well, and restored the patients to comfort.

DISLOCATIONS OF THE THUMB.

Muscular Connexion strong.—The number of strong muscles connected with the bones of the thumb, render the reductions of their

dislocations very difficult, especially when much time has been allowed to elapse from the receipt of the injury.

DISLOCATIONS OF THE METACARPAL FROM THE CARPAL BONE.

Form of.—In the majority of cases in which I have witnessed a displacement of the metacarpal bone of the thumb from the trapezium, the former has been thrown inwards towards the metacarpal bone of the fore-finger. The thumb has been bent backwards, and the extremity of the bone has formed a projection in the palm of the hand ; it has been attended with considerable pain and tumefaction.

Reduction.—In making the extension for reduction, it is particularly necessary to attend to the relaxation, as far as possible, of the most powerful muscles, which are the flexors ; thus the thumb must, during the process, be inclined towards the palm of the hand. The force applied must be continued and steady, as violence will not effect the desired object.

If simple extension does not succeed in reducing the dislocation, the part must be left to the degree of recovery which nature will effect, as it would be improper to attempt relief by any division of muscles or tendons.

Compound Dislocation.—A compound dislocation may be produced at this articulation by the bursting of a gun, and in such a case, if the tendons are not lacerated, the dislocation should be reduced, which it can be easily, and the edges of the external wound should be brought together by suture, when, with careful treatment, a good cure may be effected.

Case.—A case of this kind occurred at Brentford, under the care of Mr. George Cooper, in a young gentleman, aged thirteen ; the injury was occasioned by the bursting of a powder flask in his hand. The mass of muscle connecting the thumb to the hand was torn through, but the tendons of the long flexor, and of the extensors were not injured. The dislocation was reduced, and the wound closed by sutures and adhesive plaster, over which an evaporating lotion was applied. The wound united in part rapidly, and the remaining portion healed kindly by granulation. Two weeks after the receipt of the injury, Mr. Cooper began the use of passive motion, and the patient ultimately gained perfect motion in the joint.

Amputation required.—Should, however, the tendons be lacerated, or much surrounding mischief exist, amputation will be required ; and I have found it necessary, in such a case, to remove the articular surface of the trapezium, which I think may be done with advantage, especially when there is a scarcity of superficial soft parts.

DISLOCATION OF THE FIRST PHALANX.

Simple.—In the simple dislocation at this articulation, the first phalanx is thrown back upon the metacarpal bone, forming a projection there, whilst the end of the metacarpal bone protrudes towards the palm of the hand; the motions of the joint are destroyed, although the thumb can be made to approximate the fingers by the movements of the carpometacarpal articulation.

Reduction.—The mode of applying the extension for the reduction of this dislocation, should be as follows, and the direction should be towards the palm of the hand, to relax the flexor muscles. The hand should be soaked in warm water for a considerable time, to relax the soft parts as much as possible, then a piece of soft leather wetted, should be placed closely around the first phalanx, and over this a portion of tape, two or three yards in length, should be fixed by the clove hitch (a knot so called by sailors). An assistant should next firmly hold the metacarpal portion of the thumb, by passing his fore and middle finger between the patient's fore finger and thumb, whilst the surgeon draws the first phalanx from the metacarpal bone, in a direction somewhat inwards to the palm of the hand.

Another Method.—If the above plan does not succeed, the following should be adopted :—The leather and tape being applied as before, a strong worsted tape should be passed between the patient's fore finger and thumb, and this should be tied to a bed post, around which the arm should be bent; a pulley being then fixed to the tape connected to the first phalanx, a gradual and steady extension should be made, which will generally effect the reduction.

Sometimes not reduced.—When the above described means have been fairly tried, without success, it will be best to leave the case to nature, when the patient will, after some time, acquire a great degree of motion.

When Compound.—In cases of compound dislocation, should the reduction be difficult, a part of the extremity of the bone may be removed by amputation; and the patient may afterwards obtain a useful joint, by the early employment of passive motion.

OF DISLOCATION OF THE SECOND PHALANX.

Easily detected.—In a simple dislocation of this kind, the nature of the injury can scarcely be mistaken, and the reduction may be accomplished in the following way :—The surgeon should grasp the back of the first phalanx with his fingers, and apply his thumb upon the fore part of the dislocated phalanx, and then flex it upon the first as much as possible.

Treatment of Compound.—The treatment of the compound dislocation of this articulation, is the same as that recommended for a

similar accident in the first phalanx; but the ends of the tendon should be made smooth by the knife, when, by careful approximation, they will unite. Passive motion may be used in two or three weeks.

LECTURE XLIII.

DISLOCATIONS OF THE HIP-JOINT.

THE head of the femur may be thrown from the acetabulum in four directions.

First.—Upwards, upon the dorsum of the ilium.

Second.—Downwards, into the foramen ovale.

Third.—Backwards and upwards, in the ischiatic notch.

Fourth.—Forwards and upwards, upon the body of the pubes.

A Fifth Form.—A displacement downwards and backwards has been described by some surgeons, but I have never had an opportunity of witnessing it, and I am inclined to believe that some mistake exists about this injury, although I do not mean to deny the possibility of its occurrence.

DISLOCATION UPWARDS AND BACKWARDS ON THE DORSUM ILII.

The most Common.—This is the most common of the displacements of the hip joint, and is marked by the following signs:—

Signs of.—The limb on the injured side is from one inch and a half, to two inches and a half shorter than the sound limb. The knee and foot are turned inwards; the knee being a little advanced upon the other, and the great toe resting upon the tarsus of the other foot. The motion outwards is destroyed, so that the leg cannot be separated from the other, but the thigh may be a little bent across the sound limb. The head of the bone may be felt, and seen to move, upon the dorsum of the ilium, if the knee is rotated inwards; excepting when the injury gives rise to extensive extravasation of blood; the trochanter major is thrown much nearer than usual to the anterior superior spinous process of the ilium, so as to render the rotundity of the injured hip much less than that of the sound side. The chief marks will therefore be, difference in length, change of position, diminution of motion, and loss of projection or rotundity from the altered position of the trochanter major.

Fracture of the Cervix.—The accident with which this dislocation is most liable to be confounded, is the fracture of the neck of the thigh

bone within the capsular ligament. The distinguishing marks are, however, sufficient to prevent any mistake, if common attention be paid to the case. In the fracture of the neck of the thigh bone, the knee and foot are usually turned outwards, and the trochanter is drawn upwards and backwards upon the dorsum of the ilium ; the limb which is shortened one or two inches by the contraction of the muscles, can be restored to the same length as the other by slight extension ; but the shortening immediately recurs when the extension is abandoned ; and the limb may be readily flexed, although it creates much pain. On rotating the limb, when extended, a crepitus can be felt, which is not perceptible whilst the limb is drawn up. This fracture rarely happens, but in old persons, and is generally the effect of a very trifling injury ; it occurs, however, much more frequently than the dislocation.

Thus the greater mobility of the joint, the ease with which the length of the limb is restored ; and the perception of crepitus during rotation, when the limb is extended, furnish ample marks of distinction between the two injuries.

Diseased Hip.—The alterations in the figure of the joint produced from inflammation and ulceration, can hardly be mistaken for dislocations from violence, excepting by persons ignorant of anatomy, and but little attentive to their professional duties. The gradual progress of the symptoms, the pain in the knee, the increased length of the limb at first, and the marked shortening afterwards ; the extent of motion, and the sufferings created by any extreme movement, are differences which would hardly escape the notice of the most careless observer. The consequences of this disease, when of long standing, are ulceration of the head of the bone, ligaments, and acetabulum, accompanied with such a change of situation of the parts, as sometimes to present the appearances of dislocation, but the history of the case will readily inform the surgeon of its true nature.

State of Muscles.—In the dislocation upon the dorsum of the ilium, the pyriformis and glutei muscles, the triceps, the pectineus, the psoas magnus, and iliacus internus, the rectus, the semitendinosus, and membranousus, the obturator externus, and one head of the biceps are all shortened. The obturator internus, the gemini, and quadratus femoris are all stretched. The triceps and glutei chiefly oppose the reduction.

Cause.—This dislocation is occasioned by a fall or blow when the limb is turned inwards.

Mode of reduction.—The reduction may be accomplished in the following manner : bleed the patient to the extent of from twelve to twenty ounces, or even more if he be very robust, then place him in a warm bath, at the temperature of 100° , and gradually increase the heat to 110° , until he faints : and to accelerate the faintness, give him in solution a grain of tartarized antimony every ten minutes, until nausea is excited. When faint, remove him from the bath, envelope him in blankets, and place him between two strong posts, about ten feet asunder, and in which two staples are fixed ; or rings may be fixed in

the floor, and the patient laid between them. He should be placed upon his back, and covered well with blankets. A strong girt should then be passed between the thighs, close to the upper and inner part of the injured limb, and the ends of this should be fastened to one of the staples. A wetted roller should next be placed tightly on the lower part of the thigh, just above the knee of the injured limb, and upon this a leather belt, with straps and rings affixed for the attachment of the pulleys, should be closely buckled. The knee should be slightly bent, and the thigh directed across the sound one just above the knee. The pulleys must be attached to the straps of the belt, and to the other staple. The surgeon now should gradually and carefully commence the extension, and continue it until the patient begins to complain of pain, when he should rest a little, without relaxing, so as to fatigue the muscles; having waited a short time, he should again draw the cord, and when the patient again complains, he should again suspend the extension, and so on, until the muscles yield, and he finds the head of the bone is brought near to the acetabulum, when he should give the string of the pulleys in charge to an assistant, with directions to keep up the extension, whilst he himself rotates the knee and foot gently, under which motion the reduction will be usually accomplished. When the pulleys are used, the head of the bone does not generally return into the acetabulum with a snap, as the muscles, from continued extension, have not sufficient power remaining to allow of any powerful contraction; thus the surgeon can only be assured of the accomplishment of the reduction, by the restoration of the figure of the part, and by loosening the pulleys and examining the joint.

It sometimes happens, that the bandages get loose before the extension is sufficient, when they should be carefully re-applied, but in as short time as possible, to prevent the muscles from recovering their original tone.

Head of Bone lifted.—When the head of the femur has been brought by the extension to the edge of the acetabulum, the rotatory motion above mentioned is not always sufficient to promote the reduction, but the head requires to be lifted over the lip of this cavity; this may be performed by passing a towel or napkin as near to the joint as possible, at the upper part of the thigh, and by it an assistant may raise the upper part of the bone from the surface of the ilium.

When the reduction has been accomplished, the patient must be very carefully removed to bed, in consequence of the risk of further displacement, from the very relaxed state of the muscles.

In recent Cases.—The reduction of this dislocation may be completed, in a very recent case, before the muscles have had time to contract, by extension made in a direction, not under other circumstances, well adapted for this purpose; and I have seen it thus effected:—The mode described by Mr. Hey, if I understand it correctly, appears to me but little calculated to succeed, unless in a very recent case; but I state this with great deference, as no one can have

a higher opinion of the talents and professional acquirements of Mr. Hey, than myself, and I am not certain that I do understand, in all respects, the description of the method which he adopted.

Result of Experience.—The plans which I have recommended, are the result of considerable experience, both in public and private practice ; they have rarely failed even under the most unfavourable circumstances ; some slight deviation from them may be occasionally required, from some difference in position, but this will only be an exception to a general rule, and will occur but very seldom.

I shall relate some cases in confirmation of what I have advanced.

These first cases not only illustrate the mode of treatment detailed in the preceding observations, but particularly explain the benefits to be obtained by the employment of the pulleys, and the assistance of constitutional treatment.

Case.—I am indebted to Mr. Bennet, surgeon, at Chester, for the history of the following case. John Forster, aged twenty-two years, had his thigh dislocated in consequence of a cart passing over his pelvis, and was admitted into the Chester-Infirmity, July 10, 1818, soon after the receipt of the injury. The nature of the injury was well marked. The patient being placed upon a table, extension was made by pulleys for fifty minutes without success. He was then placed in a warm bath for twenty minutes, after which the extension was repeated for a quarter of an hour, but still without the desired effect.

He was then bled to the amount of twenty-four ounces, and he took forty drops of tincture of opium, but as this did not create faintness, the solution of tartar emetic was exhibited in small and frequent doses ; this soon produced nausea and faintness, during which a steady extension for ten minutes accomplished the reduction.

Mr. Nott, of Collumpton, Devon, sent me the following particulars :

Case.—John Lee, aged thirty-three, a very stout man, dislocated his left hip by a fall, October 9, 1819, but was not seen by Mr. Nott until the 4th of December following, just eight weeks after the accident, the effects of which still remained, exhibiting distinctly the usual appearances. The bandages and pulleys being applied, extension was gradually made, and at the time of its commencement, the solution of tartar emetic was given him, and repeated every ten minutes, but without creating much nausea. The extension still being continued, he was bled to the extent of sixty ounces, but without producing syncope. The extension was kept up for two hours, when an evident alteration was perceptible in the injured limb ; the head of the bone was elevated by means of a towel under the upper part of the thigh, and the limb was rotated ; soon after this period a grating was heard from the situation of the head of the bone, and the man immediately exclaimed that the limb was reduced ; and this, on relaxing the pulleys, we found to be correct ; before removing him to bed his legs were bound firmly together to prevent any recurrence of the displacement, and a large blister was applied over the trochanter. When he

was first allowed to rise from his bed, a bandage was applied upon the thigh and pelvis; passive motion was previously employed. In five weeks after the reduction he walked nearly twenty miles without inconvenience.

The above case shows that the reduction may be effected by skilful management a considerable time after the receipt of the injury. And this is further confirmed by cases related by Mr. Mayo, and Mr. Tripe, of Plymouth, in each of which the dislocations had existed seven weeks before the reductions were accomplished.

Without Pulleys.—The following cases prove that this dislocation may be replaced without the use of the pulleys, but at the same time show how desirable their assistance would have been.

Cases.—Mr. Holt of Tottenham requested me to visit, with him, Mr. Piper, aged twenty-five years, who was the subject of dislocation of the thigh upon the dorsum of the ilium, but which had existed a month previous to his coming under the care of Mr. Holt. Mr. Holt and myself, assisted by five powerful men, used our utmost exertions to replace the bone, and we were several times obliged, from fatigue, to relax, and renew our attempts. After repeated trials, for fifty-two minutes, we succeeded in effecting the reduction, when we had determined to make but one more effort.

Another case, which I attended with Mr. Dyson of Fore-street, was reduced without the use of pulleys, but with so much violence, and such unequal extension, that I am sure no surgeon, who had seen the pulleys employed in reducing this form of dislocation, would have recourse to any other method.

Mr. Oldnow, of Nottingham, sent me the particulars of a case in which the reduction was effected without the assistance of pulleys, but in which an extension was made from the ankle, the pelvis being secured by towels. The dislocation was recent, and the reduction easy.

DISLOCATION DOWNWARDS, OR INTO THE FORAMEN OVALE.

Signs of.—The displacement of the head of the os femoris into the obturator foramen, occasions an immediate lengthening of the limb, to the extent generally of two inches. The projection of the trochanter major is lessened, and the body is bent forwards from the stretching of the iliacus internus and psoas muscles. When the patient is erect the knee of the injured limb projects forwards, and the thigh is widely separated from the sound one from the action of the glutei and pyramiformis muscles, and it cannot be made to touch the knee of the perfect extremity without great violence. The foot is also widely separated from the other, but the toes are not either everted or inverted, but are usually directed forwards. In very thin subjects, the head of the bone may be felt, by firmly pressing the fingers upon the inner and upper part of the thigh, towards the perineum.

The chief diagnostic marks are, therefore, the increased length of the limb, the separation of the legs, and the bent position of the body.

Situation of the Bone.—The head of the bone is thrown below, and rather anterior to the axis of the acetabulum ; and a depression exists below Poupart's ligament.

Cause.—The dislocation is produced by a fall or blow when the legs are much parted from each other.

Dissection of.—The mischief occasioned by this injury is extremely well shown by a preparation in the Museum of St. Thomas's Hospital which I dissected many years ago. The head of the os femoris rested in the foramen ovale, which is entirely filled by bone, the external obturator muscle and the ligament, naturally occupying this space, being absorbed ; bony matter had been also extensively deposited around the edge of the foramen, so as to form a deep socket, which enclosed the head of the bone, so that it could not be removed without breaking the cup, but still allowing of considerable motion ; the interior of this socket was perfectly smooth. The acetabulum was half filled with ossific matter, and so much altered as not to be capable of containing the head of the thigh bone, which was but little changed, its articular cartilage still remaining perfect. The ligamentum teres was completely torn through, and the capsular ligament partially lacerated. The pectinalis and adductor brevis muscles had been torn, but had united by tendon, the psoas, iliacus internus, and pyrisformis muscles, were all stretched.

Ligamentum Teres torn.—It has been supposed that the ligamentum teres was not lacerated in this dislocation, because, in the dead subject, the head of the bone can be drawn over the lower edge of the acetabulum, if the capsular ligament be divided whilst the round ligament remains uninjured ; but as the dislocation occurs when the thighs are wide apart, and the ligament is upon the stretch, when the head of the bone is thrown from the acetabulum the ligament is torn through before the dislocation is complete.

Reduction if recent.—In recent cases the reduction of this dislocation may be easily accomplished by the following means. The patient being placed upon his back, and his thighs being separated as widely as possible, pass a girt between the upper part of the injured limb and the pudendum ; and let the ends be fixed to a staple in the wall of the room ; then grasp the ankle of the dislocated extremity, and draw the limb over the sound one, and thus the head of the bone will slip into its proper cavity. Placing the patient upon a bed, so that one of the bed-posts is received between the upper part of the thighs, and then forcing the injured limb across the sound one, will also effect the same purpose. Sometimes, however, it will be found necessary to place a second girt or bandage round the pelvis beneath that which I have already described, and the ends of this second girt should be fixed to a hook or staple on the sound side of the patient, to prevent any lateral motion of the pelvis at the time that the injured extremity is

drawn across the sound limb, otherwise the motion of the pelvis following that of the limb may prevent the reduction.

Of Long Standing.—Should the dislocation have existed for three or four weeks before any attempt is made to reduce it, the patient should be placed upon the sound side, and his pelvis fixed by one bandage, whilst another is placed under the upper part of the dislocated thigh, and connected to the pulleys above, so as to act perpendicularly; the surgeon should then press upon the knee and leg to prevent their being drawn up with the superior portion of the thigh bone, at the same time that an assistant elevates this latter part, by drawing the cord attached to the pulleys. Great care must be taken not to press the leg and knee too much, or the head of the femur will be forced backwards into the ischiatic notch, for the power of the lever which is employed is very great.

The following case was communicated to me by Mr. Daniell.

Case.—Mr. Thomas Clarke, aged fifty, received an injury to his hip in consequence of a fall from his cart in endeavouring to stop the horse, which had run away with him. Between two and three weeks after the accident, Mr. Potter, of Ongar, in Essex, was requested to visit the patient, and Mr. Daniell, being on a visit to Mr. Potter at the time, accompanied him to see the case.

On examining the injured limb, it was found to be three inches longer than the sound one, the knees were separated, and the foot turned a little outward; when the patient endeavoured to stand, his body was bent forwards.

The nature of the injury being thus extremely evident, the following means were resorted to effect the reduction of the dislocation. The patient being robust, some blood was first taken from his arm, but as this did not sufficiently reduce his powers, a solution of the tartar emetic was given to him. He was then placed on his side, near to the edge of the bed, and a girt being passed round his pelvis, was carried through the frame of the bedstead and fixed, so as to prevent any movement of the body; a second girt was passed between the thighs, and fixed to the pulleys above the upper part of the injured limb. Whilst the extension was making. Mr. Potter rotated the limb, and drew the knee towards that on the south side. When these means had been continued for about ten minutes, the effects of the tartar emetic became excessive, and in five minutes afterwards the head of the bone returned to its original socket with a snap; the patient was then placed in bed, and the injured parts supported by a roller. He speedily recovered the use of his limb.

OF THE DISLOCATION BACKWARDS, OR INTO THE ISCHIATIC NOTCH.

Common Description wrong.—In describing this dislocation, some surgeons have considered the head of the os femoris as being thrown backwards and downwards; which must have arisen from their not

recollecting the natural position of the os innominatum in the skeleton. This notch which gives passage to the pyriformis muscle, and also to the gluteal, ischiatic and internal pudendal arteries, with the sciatic nerve, is naturally situated a little above, as well as behind the acetabulum, so that the head of the thigh bone when displaced into this space, is placed upwards as well as backwards, with respect to the acetabulum; and this you must carefully bear in mind.

Situation of Bone.—The head of the os femoris in this dislocation is situated on the pyriformis muscle, between the edge of the bone which forms the upper part of the ischiatic notch, and sacro-sciatic ligaments.

Difficult to detect.—Of all the dislocations of the thigh, this is the most difficult to detect, because the length of the limb is but little altered, and the change in the position of the knee and foot is not so marked as in the dislocation upwards. It is also more difficult of reduction, because the head of the bone is placed deeply behind the acetabulum, and requires to be lifted over the edge, as well as drawn towards it.

Signs of.—The dislocation is marked by the following signs:—The limb is from half an inch to one inch shorter than the sound one, but rarely more than half an inch. The natural projection formed by the trochanter major is diminished, and is inclined towards the acetabulum, but still remains at right angles with the ilium. The head of the bone can only be felt in very thin persons, and then not very distinctly. The knee and foot are turned inwards, and the great toe rests against the ball of the great toe of the sound limb. When the patient is erect the toe touches the ground, but the heel does not quite reach it, and the knee is bent and projects a little forwards. The motions of the joint are in a great degree prevented, admitting but of slight flexion and rotation.

Dissection of.—There is in the collection at St. Thomas's Hospital, an excellent specimen of this injury, which I met with accidentally in the dissecting-room. The original acetabulum is entirely filled by a ligamentous substance, so that it could not have again received the head of the femur; the capsular ligament is torn anteriorly and posteriorly; the round ligament is torn through; the head of the bone rests in the situation I have before described; but there is not any appearance of an endeavour to form a new socket for its reception. A new capsular ligament surrounded the head of the bone, but it has been opened and turned down to exhibit the head, with the lacerated portion of the ligamentum teres connected to it.

Cause.—The displacement occurs from the application of violence when the thigh is bent at right angles with the body, so that the knee is forced inwards.

Reduction.—The reduction, which is extremely difficult, is best effected in the following manner:—Place the patient on a table upon his sound side, and fix the pelvis by passing a girt between the pudendum and inner part of the thigh, and making it fast to some firm point;

then apply a wetted roller round the limb above the knee, and over it buckle the leather strap, and place a towel under the upper part of the injured thigh. The extension should then be commenced with the aid of the pulleys, so as to draw the dislocated thigh forwards in a direction over the middle of the sound one, measuring from the pubes to the knee; when this has been continued for a short time, an assistant should elevate the upper part of the bone, by drawing the towel with one hand, whilst he presses on the pelvis with the other; and by this means he will lift the bone over the brim of the acetabulum. A round towel passed under the upper part of the thigh, and over the shoulders of the assistant, will allow him to employ more force for this purpose, by raising his body at the same time that he rests both hands upon the pelvis of the patient.

Another Mode.—I have known another method succeed in effecting a reduction of this dislocation, although the one I have described is the best.

Case.—A man, aged twenty-five, was admitted into Guy's Hospital, under the care of Mr. Lucas, on account of a dislocation of his thigh backwards. An extension was made by means of the pulleys, drawing the limb in a line with the body, and at the same time thrusting the trochanter major forwards with the hand; the reduction was accomplished in about two minutes.

Signs of Reduction.—The reduction is generally indicated by a snap which takes place when the head of the bone returns into the acetabulum; but when the muscles have been some time contracted, and when an extreme state of nausea has been produced by bleeding, and the tartar emetic, the reduction is not accompanied by any noise, as in the following case, the particulars of which were given me by Mr. Worts, a dresser to Mr. Chandler, at St. Thomas's Hospital.

Case.—James Hodgson, aged thirty-eight, a strong muscular man, was admitted into St. Thomas's Hospital, on Tuesday, February 8, 1820; his left thigh being dislocated backwards. On account of the great swelling which existed at the time of his admission, the nature of the injury was not considered sufficiently evident, and merely evaporating lotions were applied. On the 12th the patient was seen by Mr. Chandler and Mr. Cline, and the latter thought it a case of dislocation. On the 14th Mr. Chandler requested me (Sir Astley) to see the case, when I immediately declared it to be a dislocation into the ischiatic notch, and directed that the man should be bled, as he suffered considerable pain, and the tension about the injured part was still very great. On Saturday the 19th, the pain and swelling having subsided, means were employed to effect the reduction. After bleeding the patient largely, and giving him the tartar emetic, the bandages and pulleys were applied as I have already directed, and the extension conducted in the same manner. The extension was continued for about ten minutes before any attempt was made to raise the head of the bone, but it was then tried, and at the same time the limb was rotated by turning the knee outwards. After the expiration of a quarter of an hour, the ap-

pearance of the hip became much altered, and of its natural shape ; but as no snap had been heard, the same means were continued for twenty-five minutes longer, when, in consequence of the strap above the knee becoming loose, the pulleys were removed, and it was then discovered that the reduction was accomplished ; but it had occurred without either the by-standers or the patient being aware of it.

OF THE DISLOCATION ON THE PUBES.

Easily detected.—This is more readily detected than any other of the dislocations of the thigh.

Cause.—It generally happens by the foot slipping unexpectedly into some hollow, whilst a person is walking, the body being at the time bent backwards, so that the head of the os femoris escapes forwards.

Signs of.—The following signs usually indicate this displacement ; the injured limb is an inch shorter than the sound one ; the knee and foot are turned outwards ; but what renders it so evident, is the readiness with which the head of the bone can be felt a little above the level of Poupart's ligament, upon the pubes, on the outer side of the femoral artery and vein ; it there forms a round hard swelling, which moves when the thigh is bent.

Mistaken.—Although so easy to distinguish, yet I have known three cases in which the injury has been overlooked, until too late to afford relief ; this could only have arisen from great carelessness, or excessive ignorance.

Dissection of.—A preparation from one of these neglected cases, which I had an opportunity of dissecting, is preserved in the museum at St. Thomas's Hospital. It presents the following appearances :—The acetabulum is in part filled by a new deposit of bone, and is in part occupied by the trochanter major, but both are very much altered. The capsular ligament is very extensively torn, and the ligamentum teres entirely divided. The head of the bone is placed on the pubes under Poupart's ligament, which has been thrust up by it ; the iliacus internus and psoas magnus muscles, are stretched over the neck of the bone, and upon them is the anterior crural nerve. Both the head and neck of the bone are flattened, and the latter rests in a new articular cavity formed for it upon the pubes, above the level of which the head of the femur is situated. The edges of the new acetabulum project upon each side of the neck of the bone, so as to confine it laterally, whilst Poupart's ligament confines it upon the fore part. The femoral artery and vein pass close to the inner side of this cavity, for the cervix of the femur.

This injury might be mistaken for a fracture of the neck of the bone, but only through great carelessness and inattention.

Reduction of.—The reduction of the dislocation may be accomplished in the following way :—Place the patient upon a table on his sound side ; then pass a girt between the pudendum and the upper and inner

part of the injured limb, and fix this to a staple rather before the line of the patient's body. The wetted roller, strap, buckles and pulleys, should then be placed above the knee, as before described for other displacements. The extension is to be made backwards and downwards. The application of the towel at the upper part of the thigh, and lifting the head of the bone by it, over the edge of the acetabulum, is also necessary in reducing this form of displacement.

The following case, which will illustrate the mode of reduction, occurred under the care of Mr. Tyrrell, at St. Thomas's Hospital.

Case.—Charles Pugh, aged fifty-five, was admitted into St. Thomas's Hospital on the 23d of January, 1823, with a dislocation of the right thigh, which had been produced by a blow upon the back part of the thigh, from a cart wheel, at the time he was making water at the corner of a street, and unprepared to resist the violence. The head of the bone could be distinctly felt below Poupart's ligament, immediately to the outer side of the femoral vessels. The foot and knee were turned outwards, with very little alteration in the length of the limb. The thigh was not flexed towards the abdomen, and was nearly immovable, admitting only of slight abduction and adduction, also a little rotation outwards, but not at all inwards. It was speedily reduced by the following means :—The patient was placed on his left side, a broad band was placed between his thighs, and being tied over the crista of the ilium on the right side, was made fast to a ring in the wall. A wet roller having been put on above the right knee, a bandage was buckled over it, and its straps attached to the hooks of the pulleys, by which a gradual extension was made, drawing the thigh a little backwards and downwards when this extension had kept up a short time, another bandage was applied round the upper part of the thigh, close to the perineum, by means of which the head of the bone was raised, and in the course of a few minutes the reduction was easily accomplished. The patient had not been bled nor taken any medicine; he suffered but little after reduction, and was able to walk without pain or inconvenience five or six days afterwards.

Frequency of the different Dislocations.—From what I have observed respecting the comparative frequency of the dislocation of the thigh, I should think the proportion in twenty cases about as follows :—twelve on the dorsum ilii; five in the ischiatic notch; two in the foramen ovale; and one on the pubes.

Formerly overlooked.—Considering the frequent occurrence of these dislocations, it is extraordinary that they should have escaped the observations of former surgeons; it can only be accounted for by the difficulties which existed in the pursuit of morbid anatomy. I was informed by Mr. Cline, that Mr. Sharpe, a surgeon of Guy's Hospital, possessing considerable eminence, and author of a "Treatise on Surgery," did not believe that these displacements ever took place.

Now readily recognized.—There is great pleasure in contrasting the present state of professional information with that which existed fifty years ago. Our provincial surgeons now readily detect these in-

juries, and generally succeed in reducing them. Let us never, however, forget that it is to the knowledge of anatomy, and more especially, of morbid anatomy, that we are indebted for this superiority ; and therefore we should never neglect or lose an opportunity of pursuing our investigation on these points, if we wish to increase our reputation as surgeons, and practice our profession with credit.

INJURIES LIABLE TO BE MISTAKEN FOR DISLOCATIONS OF THE HIP.

Of Fractures of the Os Innominatum.

In these cases the application of the force necessary to reduce a dislocation, increases excessively the patient's sufferings, and destroys the probability of recovery, if any previously existed.

Signs of.—When a fracture occurs of the os innominatum, which extends through the acetabulum, the head of the os femoris is drawn upwards, and the trochanter major is turned a little forwards ; thus the leg is somewhat shortened, and the knee and foot are a little inverted, resembling the appearances produced by a dislocation into the ischiatic notch.

When the sacro-iliac junction is broken through, and the pubes and ischium are fractured, the limb is in a great degree shortened ; but the position of the knee and foot is not altered.

Differ from Dislocation.—These injuries do not affect the motions of the hip joint so much as dislocations, and a crepitus can be felt if the limb be moved whilst the hand rests upon the crista of the ilium.

I have seen three cases of fracture of the os innominatum, somewhat resembling dislocations, two in which the injury extended through the acetabulum, and one in which this cavity remained uninjured ; the following are the principal features of these cases.

Cases.—In the year 1791, a man was admitted into St. Thomas's Hospital, on whom a hogshead of sugar had fallen. When examined, his right leg and foot were found inverted, and the limb appeared shorter than the left by two inches. Whilst making a gentle extension to endeavour to bring the injured limb to an equal length with the perfect extremity, a crepitus was discovered in the os innominatum. The patient was exceedingly pallid, his muscular power extremely feeble, and he appeared rapidly sinking. He expired the same evening. The following appearances presented themselves when the body was examined :—The deep part of the acetabulum was broken off, so as to allow of the escape of the head of the thigh bone from the cavity ; the neck of the bone was firmly embraced by the tendon of the obturator internus, and by the gemini ; the junction of the pubes at the symphysis had been separated, and the bones were nearly an inch apart ; the ilium, ischium, and pubes were fractured, and the fracture extended through

the acetabulum ; the left kidney was much injured, and about a pint of blood was found extravasated into the cavity of the abdomen.

In the second case, which also was in St. Thomas's Hospital, the appearances of a dislocation backwards existed. The patient died upon the fourth day after the receipt of the injury ; and on examination after death, an extensive fracture of the innominatum was discovered, passing through the acetabulum and dividing it into three parts ; the head of the os femoris was deeply sunk into the cavity of the pelvis.

The third case in which the acetabulum escaped was brought into Guy's Hospital in the year 1817, August the 8th. Mary Griffiths, aged thirty, had her pelvis caught between a cart wheel and a post ;—when admitted into the hospital, she was pale, feeble, and her fæces passed off involuntarily. On grasping the right os innominatum a distinct motion and crepitus could be perceived, and the posterior superior spinous process projected much above its natural situation. The pubes appeared driven in towards the cavity of the pelvis. An extensive ecchymosis existed upon the right side below the last rib. The pelvis was fixed by a broad bandage, and some opium was administered. She lived until the evening of the 24th, and appeared to sink from the effects of a large slough, which formed over the seat of extravasation upon the right side.

Examination.—The body was inspected the next day, when an extensive fracture was found extending through the body of the pubes and the ramus of the ischium on the left side ; the right ilium was separated from the sacrum at the sacro iliac symphysis, with a portion of the transverse processes of the sacrum which were torn from the sacrum with the ligaments ; the left sacro iliac junction had also given way, but only to a sufficient extent to admit the narrow extremity of the handle of the scalpel between the bones.

I have known several cases of simple fracture of the innominatum recover.

OF FRACTURES AT THE UPPER PART OF THE THIGH BONE.

Mistaken for Dislocation.—These injuries have been frequently mistaken for dislocations of the hip, and the distinguishing marks are sometimes with difficulty detected.

Three species of.—Three species of fracture differing in their nature and result, and requiring distinct modes of treatment, are met with at the upper part of the femur, and have been generally classed under the indiscriminate appellation of fracture of the cervix femoris. Want of proper anatomical investigation by dissection, has given rise to this confused classification, and has led to the disputes respecting the processes which nature employs to effect a cure. Thus one surgeon declares that they cannot be united, whilst another asserts that the cure is as easily performed as in fractures of other bones.

The opinions I am about to offer to you, are the result of extensive

observation on the living, who have suffered from these injuries ; of numerous examinations of the dead body ; and of many experiments which I have performed upon inferior animals.

Of frequent Occurrence.—These accidents are of such frequent occurrence, that the wards of our hospitals are seldom without an example of them ; whilst scarcely two cases of dislocation happen there in the course of a year, although the buildings contain about nine hundred patients.

The different species of injury are as follow : —

First.—That which takes place through the neck of the bone entirely within the capsular ligament.

Secondly.—A fracture through the neck of the thigh bone at its junction with the trochanter major, external to the capsular ligament.

Thirdly.—Fracture through the trochanter major, beyond the cervix femoris.

OF FRACTURE OF THE NECK OF THE THIGH BONE WITHIN THE CAPSULAR LIGAMENT.

Signs of Limb shortened.—The following appearances are usually produced by this fracture :—the limb becomes shortened one or two inches ; this arises from the connexion between the head of the bone and the trochanter major being destroyed, so that the latter loses its support and is drawn up by the action of the glutei muscles, as far as the capsular ligament will admit of ; and it therefore rests upon the edge of the acetabulum, and a little upon the ilium above it. This difference in length is readily detected by placing the patient in a recumbent posture and comparing the situation of the malleoli ; the heel of the injured extremity is usually found resting in the hollow between the internal malleolus and the tendo-achillis of the sound limb ; but this is not always the case. For a short period after the receipt of the injury, this shortening may be made to disappear by a very slight extension of the limb, but it again re-appears immediately that the extension is discontinued. This may be again and again effected, until the muscles acquire a fixed contraction, which cannot be subdued but by very great force.

Limb everted.—Another indication of this accident is the eversion of the knee and foot, from the action of the powerful and numerous rotators outwards, which have but very feeble opponents ; the ob-turatores, the gemini, the pyriformis, the quadratus, the gluteus maximus, the pectinalis, and the triceps, all assist in the rotation of the limb outwards ; whilst only a part of the gluteus medius, with the minimus and the tensor vaginæ femoris act as antagonist muscles, or rotators inwards. The eversion is by some considered as depending on the weight of the limb, and not upon the muscular contraction ; but the resistance afforded by the rotators outwards, when an endeavour is made to turn the limb inwards, sufficiently prove the true cause of

the eversion. The inversion is also in some degree prevented by that portion of the neck which remains attached to the trochanter major, and which rests against the ilium.

Principal Marks.—The shortening of the limb, and the eversion of the knee and foot, are the two principal marks which attract the attention of the surgeon.

How produced.—When the femur is dislocated upwards, eversion of the knee and foot is prevented by the head and neck of the bone ; but the separation of these from the trochanter in the case of fracture, allows of a ready eversion. I have known the limb inverted in a case of fracture of the cervix femoris, but this must be regarded as an extremely rare circumstance.

Symptoms not well marked at First.—The nature of this injury is not well marked until some few hours after the receipt of the injury, as the muscles do not acquire a fixed contraction for some time ; it is from this circumstance that the injury has been mistaken for dislocation, and that the patients, even in the large hospitals, have been submitted to useless and painful attempts to reduce the displacement.

Degree of Suffering.—After the receipt of this injury, the patient suffers little or no pain whilst at rest in the recumbent posture, but rotation of the limb, more particularly inwards, creates much suffering from the fractured end of the bone rubbing upon the synovial membrane, which lines the capsular ligament. The pain is most acutely felt at the upper and inner part of the thigh, near the insertion of the psoas and iliacus internus muscles, into the trochanter minor.

The limb can be moved in all directions, but the flexion creates pain, and is accomplished with difficulty, particularly if the thigh be directed towards the pubes ; if the knee be carried outwards when the thigh is flexed it is accomplished with more ease, and without producing much pain.

Trochanter Major projects less.—The trochanter major of the injured side projects less than that of the sound side, as it has lost the support of the neck ; it is also drawn up towards the ilium, and is therefore higher than that of the perfect limb.

Patient examined erect.—To be perfectly satisfied of the nature of the injury, the patient should be examined in the erect as well as in the recumbent posture ; he should be made to stand, which he can do with assistance, and endeavour to bear his weight upon the sound extremity, when the shortening of the injured limb is distinctly seen, the knee and foot are everted, and the prominence of the hip is lessened.

Pain on Standing.—In attempting to rest upon the unsound limb, the patient experiences great pain in consequence of the stretching of the psoas, iliacus internus, and obturator externus muscles, as well as by the pressure of the fractured portion of the cervix upon the capsular ligament.

Crepitus.—The fracture is not indicated by a crepitus on motion whilst the patient is recumbent, as in other fractures, but it can generally be felt, when the limb is extended to the original length, and then

rotated ; the crepitus may sometimes be discovered on the mere elongation of the extremity, but it is most distinct if it be turned inwards.

Most frequent in Females.—Females are more liable to this accident than males, which may be accounted for by the powers of the constitution being generally weaker, and the natural position of the neck of the thigh bone more horizontal.

In old Age.—The period of life at which this injury occurs, is another circumstance worthy of consideration, as it seldom takes place but at an advanced period of life. We find it described as happening in young persons, but in these cases the injury has not been really confined to the cervix within the capsular ligament, and thus so much confusion has arisen with respect to the true character of the accident. During a period of forty years, for which I have attended St. Thomas's and Guy's Hospitals, and in my private practice, which has been more than my share, I have seen between two and three hundred cases of fracture of the cervix femoris, within the capsular ligament ; yet in very few instances have I known it to take place in persons under the age of fifty years. It is most frequently met with between the ages of fifty and eighty, at a time of life when dislocation very rarely takes place. I have, however, seen a case of the fracture at the age of thirty-eight, and a case of dislocation at sixty-two.

Reasons for.—The liability to the different forms of injury at the different periods of life, is owing to the changes which are taking place in the bones as well as in the other structures of the body, according to the balance of the arterial and absorbent systems ; during youth the action of the former preponderates, and hence the source of growth ; in middle age the two preserve an equilibrium of action, and thus but little alteration occurs ; in old age the absorbents exceed in activity the arteries, from which a diminution arises, but this is rather from a disease of power in the arteries than an increase in the absorbents.

Change in Bones.—Thus the increase of the bones takes place in youth, until they acquire that bulk, weight, and compactness which characterizes them at the adult period, and which they for some time retain, until they become gradually light and soft in the advance period of life : even the neck of the thigh bone undergoes a considerable change from an interstitial absorption, by which it becomes shortened, and altered in its angle with the shaft of the bone, the head often sinking beneath the level of the trochanter major, instead of being above it. This alteration gives the idea, upon a superficial inspection, of there having been formerly a fracture which had united.

Period of Change varies.—The period at which these alterations take place, vary in different individuals, as we find the general appearances do, which indicate old age, and which are as strongly marked in some at sixty, as in others at eighty years of age.

It is from these changes, however, that the nature of injury varies generally at the different periods of life, as from the different states of the bones, that violence which would produce dislocation in the adult, occasions fracture in the old person ; and when dislocation does occur

at an advanced period of life, it is in those persons who have particularly strong constitutions, and in whom the bones have not undergone the changes I have described.

Causes very slight.—The very slight causes which often occasion fracture of the bones in old persons, is a proof how much this altered state predisposes to such injury. The most frequent cause of the fracture of the neck of the thigh-bone, in London, is a sudden slip from the foot to the carriage pavement ; which, although only a fall of a few inches, yet it is sufficient to produce this serious accident. It is also often occasioned by a slight fall upon the trochanter major ; and I have known it produced by the toe catching in the carpet, or against some projection in the floor, at the time that the body was suddenly turned to one side. It is particularly necessary to recollect the very slight causes which give rise to this injury, and to be on your guard respecting it, otherwise it could hardly be supposed that an accident of so serious a nature could be so easily produced.

Opinions on Mode of Union.—With respect to the mode in which these fractures of the neck of the thigh bone within the capsular ligament unite, much difference of opinion exists ; it is asserted by some surgeons, that these fractures unite like those occurring in the other bones of the body ; but from the numerous dissections which I have had an opportunity of performing in these cases, I firmly believe that, as a general rule, the transverse fracture of the cervix within the capsule does not unite by bone ; such is the opinion I have delivered in my lectures for these thirty years, and which has been from year to year strengthened by further observations and fresh dissections.

Want of Bony Union.—In all the examinations which I have made of these cases, I have seen but one in which a bony union had followed a transverse fracture of the neck of the bone within the capsular ligament. I do not, however, mean to deny the possibility of a bony union, or to maintain that it cannot take place, but it is an exceedingly rare circumstance. Considering the various modes in which a fracture may take place, the degree of violence which may occasion it, and the extent of mischief to the surrounding parts, which may accompany it, it would be presumptuous in any one to maintain the impossibility of a bony junction ; the bone may be broken without the fractured ends being separated from each other, or without any laceration of its periosteum, or the reflected ligament which covers its neck ; and again, the fracture may be in part within, and in part without the capsular ligament ; under this latter circumstance, I well know that an ossific union might be produced ; and I have had the opportunity of seeing more than one.

Causes preventing Bony Union.—I shall now point out several circumstances which in my opinion tend to prevent an ossific union after a transverse fracture of the neck of the thigh bone within the capsular ligament.

Want of Apposition.—In the first place, a want of proper apposition of the fractured extremities of the bone may in many cases have consi-

derable effect in preventing the union by ossific matter, as we find that a proper junction does not take place between the broken portions of the bone, in any part of the body, when the extremities are much separated from each other.

Cases.—In the case of a boy, from whom a portion of the tibia was removed in consequence of its protruding from compound fracture, but in whom the fibula remained uninjured, so that the ends of the divided tibia could not be brought into contact, no bony union took place.

A case somewhat similar occurred in the Bristol Infirmary, under the care of Mr. Smith. A portion of diseased tibia, between two and three inches in length was removed, leaving a space to that extent between the ends of the bone; and six weeks after the operation the boy was able to walk about without much difficulty, and it was supposed the ossific union had taken place; but in consequence of his death from small pox, an opportunity occurred of examining the limb, when the larger part of the former space was found to be occupied by a thin ligamentous substance, without any bony deposit.

Experiments.—This is also confirmed by experiments which I have made on other animals. I took out a portion of the radius of a rabbit measuring seven-eighths of an inch in length, after which the ends of the bone did not unite to each other, but formed connexions to the ulna; in a second experiment, I removed a portion of the radius from another rabbit, measuring only one-ninth part of an inch, but with the same result. Also a portion of the os calcis being separated and drawn above its natural situation by the action of the gastrocnemius muscle, only united by ligament.

Motion of the Part.—In the fracture of the cervix femoris it is extremely difficult to keep the limb in a proper and steady position, as the most trifling change in position produces some motion of the part from the contraction of the powerful muscles which pass from the pelvis to the thigh. Were this, however, the only difficulty, it might possibly, with much care and attention, be in a great measure obviated.

Want of continued Pressure.—Even in those cases in which the length of the limb is properly preserved, another circumstance I conceive may operate to prevent the bony union, which is the want of pressure of one portion of bone upon the other, when the capsular ligament remains entire. This arises from the secretion of a large quantity of synovial fluid into the capsule, which distends the ligament, and prevents the proper contact of the broken bones. After the inflammatory process has subsided, and the effusion of ligamentous matter has taken place from the synovial membrane, then this fluid becomes absorbed.

How prevented.—In other fractures where the bones are surrounded by muscles, the broken extremities are kept pressed together by the action of these muscles; but in the fracture taking place through the neck of the thigh bone, the muscles can only act upon one portion, and that in such a way as tends to separate one from the other.

Pressure essential.—That pressure is essential to the bony union,

is proved by the examination of those cases in which the fractured ends of the bone overlap each other, when a proper ossific deposit is found on that side where they press upon each other; whilst on the opposite sides, where no pressure exists, scarcely any alteration can be perceived. Again, in those cases where the actions of the muscles separate the fractured ends of a bone, as we frequently find, union does not take place until the surgeon produces the necessary pressure by artificial means; as by the application of a belt, which buckles tightly round the limb.

Deficiency of Ossific Inflammation.—A third circumstance, however, tends principally to explain the want of bony union; in these cases, it is the deficiency of ossific inflammation in the head of the bone, when separated from the cervix; it is then only supported by the vessels passing from the ligamentum teres, which are minute and few in number. In the perfect state, the head and neck of the femur are chiefly supplied with blood by the vessels of the cancelli of the cervix, and by those of the reflected membrane which covers it. If, therefore, in cases of fracture the reflected membrane be torn through, which it generally will be, the chief source of supply to the head of the bone, and that portion of the neck connected with it, is cut off, and there is not sufficient organic power remaining to produce ossific matter; thus we find that scarcely any change takes place in the head of the bone, similar to that occurring in other bones when fractured; there is merely a layer of ligamentous substance thrown out, and covering the surface of the cancellated structure.

Dissection.—On examining these injuries by dissection, we usually find the following appearances:—The head of the bone remains in the acetabulum connected by the ligamentum teres. There are upon the head of the bone very small white spots, covered by the articular cartilage. The cervix is sometimes broken directly transversely, at others with obliquity. The cancellated structure of the broken surface of the head of the bone, and of the cervix, is hollowed by the occasional pressure of the neck, attached to the trochanter, and consequent absorption; and this surface is sometimes coated partially with a ligamentous deposit. The cancelli are rendered firm and smooth by friction, as we see in other bones which rub upon each other when their articular cartilages are absorbed, giving the surface the appearance of ivory. Portions of the head of the bone are broken off, and these are found either attached by means of ligament, or floating loosely in the joint, covered by a ligamentous matter; but these pieces do not act as extraneous bodies, so as to excite inflammation, and thus produce their discharge; not more than those loose portions of bone covered by cartilage, which are found so frequently in the knee, and sometimes in the hip and elbow joints. With respect to the neck of the bone which remains attached to the trochanter major, the most remarkable circumstance is, that it is in a great degree absorbed, but a small portion of it remaining; its surface is yellow, and bearing the character of ivory, if the bones have rubbed against each other. Some ossific deposition I

have seen manifested around this small remaining part of the neck of the bone, and upon the trochanter major, and thigh bone below it, in some examples of this fracture.

Capsular Ligament thickened.—The capsular ligament, enclosing the head and neck of the bone, becomes much thicker than natural ; but the synovial membrane undergoes the greatest change from inflammation, being very much thickened, not only upon the capsular ligament, but also upon the reflected portion of that ligament upon the neck of the bone, as far as the edge of the fracture.

Increase of Synovia.—Within the articulation, a large quantity of serous synovia is found ; by which term I mean to express, that the synovia is less mucilaginous, and contains more serum than usual ; this fluid by distending the ligament, separates for a time one portion of bone from the other ; it is produced by the inflammatory process, and becomes absorbed when the irritation in the part subsides. I do not know the exact period at which this change takes place, but I have seen it in the recent state of the injury. Into this fluid is poured a quantity of ligamentous matter, by the adhesive inflammation excited in the synovial membrane, and flakes of it are found proceeding from its internal surface, uniting it to the edge of the head of the bone. Thus the cavity of the joint becomes distended, in part by an increased secretion of synovia, and in part by the solid effusion which the adhesive inflammation produces ; the membrane reflected on the cervix femoris is sometimes separated from the fractured portions, so as to form a band from the fractured edge of the cervix to that of the head of the bone ; bands also of ligamentous matter pass from the cancellated structure of the cervix to that of the head of the bone, serving to unite, by this flexible material, the one broken portion of the bone with the other.

Ossific Deposit on the Body of the Bone.—The trochanter is drawn up more or less in different accidents ; and in those cases in which it has been very much elevated, I have known a considerable ossific deposit take place upon the body of the thigh bone, between the trochanter major and the trochanter minor. When the bone has been macerated, its head is much lighter and more spongy than in the healthy state, excepting on those parts most exposed to friction, where it is rendered smooth by the attrition, which gives it a polished surface.

In most Cases no Ossific Union.—It may, therefore, be considered as a general principle, that ossific union is not produced in these cases ; nature makes some efforts to effect it on that portion of the fracture attached to the body of the bone, but scarcely any upon the head and portion of the cervix separated with it.

Not only in the Hip Joint.—This want of ossific union does not appear to be merely confined to the fracture of the cervix femoris, but also occurs in the fractures of the condyles, of the os humeri and coronoid process of the ulna, and other articular processes, when broken off entirely within the capsular ligament.

These opinions, which I have for many years delivered in my lec-

tures, have been confirmed by many cases in which I have had an opportunity of dissecting the injured joint, and also of the result of the experiments which I have performed on other animals, and in which I found only a ligamentous union occur when the fracture was confined to within the capsular ligament.

Confounded with Dislocations.—The cases of fracture of the cervix femoris may be confounded with those dislocations of the hip in which the limb is shortened; viz., those occurring on the dorsum ilii, the ischiatic notch, and on the pubes; the eversion of the knee and foot, with the greater mobility of the limb will distinguish them from the two former; and in the latter instance, the readiness with which the head of the bone can be felt in the groin, renders the case sufficiently obvious.

With other Fractures.—They may be also confounded with the cases of fracture external to the capsular ligament; but if the surgeon be sufficiently attentive to the following points, he will readily distinguish the difference:—the age of the patient, the length of the limb, the cause of the injury, the feeling of crepitus, the great extravasation of blood, and the degree of suffering; for the fracture of the cervix generally occurs at an advanced age; the limb is shortened, the cause of the injury very slight, there is not any perception of crepitus until the limb be elongated, and the degree of suffering is very trivial.

Various Modes of Treatment.—In the treatment of the fractures of the neck of the thigh bone, within the capsular ligament, I have tried numerous and various means, to endeavour to effect a bony union, and I have known other surgeons adopt many ingenious plans with the same view, but all without success.

The double inclined plane has been employed with numerous contrivances to keep the injured limb extended, and to support the fractured portions in contact, also to prevent as much as possible, the motions of the pelvis. The straight position, with various modifications, has likewise been employed; indeed, I scarcely know any form of mechanical treatment which could be adopted, which has not been tried, for the purpose of aiding the bony union in these cases. I have not, however, yet witnessed one single example of such a union, which was not doubtful, as to its being entirely within the ligament.

Case.—In a convict at Sheerness, who could be completely controlled, the limb was kept steadily extended for six months, yet it united only by ligament.

I am aware that instances of success have been published; but I cannot give credence to such cases, until I see that the authors are aware of the distinction between fractures within, and those without the capsular ligament; and that they are likewise acquainted with those changes in the head and neck of the bone, which occur in advanced age.

Treatment recommended.—Not having found or known any mode of treatment succeed in effecting an ossific union in these cases, and

having repeatedly seen the patient's health much injured by the trials which have been made, all that I now direct to be done, is, that a pillow should be placed under the limb for its whole length, and a second, rolled up, put under the knee, and that the limb should be allowed to remain upon these for ten days or a fortnight, until pain and inflammation have subsided ; the patient should then be allowed to rise and sit in a high chair, to prevent much flexion of the limb, which would be painful. In a few days more he should begin to walk with crutches, and after a time a stick should be substituted for the crutches, and in a few months he will be able to use the limb without any adventitious support ; when he commences to bear the weight of the body on the limb, he should be provided with a high heeled shoe, which will much assist him.

Degree of Recovery.—The period and degree of recovery in these cases, depend much upon the bulk of the patient ; as the very corpulent patient will, for a long time, require the aid of crutches, in others less bulky, a stick only will be required ; and in very spare persons such assistance is only necessary for a very short period ; but unless a shoe be worn having a sole sufficiently thick to remedy the diminished length of the limb, the patient has a considerable degree of lameness.

In doubtful Cases.—Should any doubt exist as to the fracture being situated external or internal to the capsular ligament, the case should be treated as for the former injury, which I shall presently describe, and in which ossific union may be procured.

A cautious Opinion necessary.—The surgeon should be very cautious in the opinion he gives respecting the result of these injuries, as when the fracture is transverse, lameness is certain to follow ; but in various degrees, which cannot at first be estimated.

Sometimes Fatal.—In very aged and infirm persons, this accident sometimes produces fatal consequences, from the exhausted state of the constitution, and from the confinement in the attempts at union.

OF FRACTURES OF THE CERVIX FEMORIS, EXTERNAL TO THE CAPSULAR LIGAMENT.

Difficult to distinguish.—The symptoms produced by this injury are, in many points, so similar to those accompanying the former injury, that great attention is necessary to distinguish them. Such a distinction, is, however, highly important, as the result differs so materially, an ossific union being readily produced when the injury is external to the capsular ligament ; whereas, in that which I have already described, such a union, rarely, if ever, takes place.

Signs of.—When the fracture occurs external to the ligament, the injured limb is but little shorter than the other ; the foot and knee are everted, the rotundity of the hip is lost, and the patient experiences much pain at the hip, and about the upper and inner part of the thigh.

These marks are also found when the fracture takes place internal to the capsular ligament.

Distinguishing Signs of.—The following are the principal signs by which the nature of these injuries may be detected:—1st. The fracture external to the capsule occurs frequently at an earlier period of life than that which takes place internal to the joint; although I have known it produced after fifty years of age, yet it is usually found under that age. 2d. The injury is generally occasioned by much greater violence, as by severe blows or falls, or the passage of laden carriages over the pelvis, whereas the internal fracture is the consequence usually of very slight cause. 3d. The crepitus in the fracture external to the ligament, is readily felt when the limb is slightly moved, and generally without drawing it down. 4th. The degree of suffering is much greater, especially on moving the limb, if the injury be external to the capsule, as the rough extremity of the bone penetrates the surrounding muscles; the limb also is much more swollen, and the constitutional irritation is considerable. 5th. There is great extravasation of blood, generally, in these cases.

Dissection of.—In dissecting these cases, the fracture is generally found at the root of the neck of the bone, external to the capsular ligament; but its seat and extent varies very much in different examples, and the degree of shortening of the limb, depends upon the form of the fracture, and upon the extent of laceration of the surrounding soft parts, so as to admit of retraction.

Complicated.—Sometimes the fracture external to the capsular ligament is complicated with injury of the trochanters.

Case.—Mr. Travers has an excellent specimen of this form of injury taken from a patient who was under his care in St. Thomas's Hospital.

Richard Norton, aged sixty, was admitted into the Hospital on the 24th of January, 1818, in consequence of severe injury of his left hip, occasioned by a fall upon the curb stone of the foot pavement. The limb of the injured side was shortened, and the knee and foot everted; the swelling about the hip was very great; the limb could be moved freely in all directions, but not without creating much suffering; and when moved a crepitus could be distinctly felt in the situation of the trochanter major. When the swelling had in great measure subsided, the limb was confined by the application of the long outer splint, and two thigh splints were bedded. In March the splints were removed, when the limb was found to be a little shortened, but the hip had regained its natural appearance. About a month after this, he began to use his limb, walking with the aid of crutches. He was afterwards placed under the care of the physician, on account of his general health being defective, and he died suddenly, being seized with spasms in his chest.

Dissection.—On examining the hip after his death, the fracture was found to have extended through the trochanter, some way down the bone, and it had apparently united with very slight deformity, but on macerating the bone, the head and neck became loose on the body of the femur; they could not, however, be perfectly separated, as a shell of bone had formed, confining the head and cervix.

The preparation which Mr. Travers was so kind as to send me, presents the following appearances :—the head and cervix of the bone had been separated from the trochanter major and body of the femur. The upper part of the bone had been obliquely split, so as to receive the cervix into its cancelli. This fracture had divided the posterior portion of the trochanter major from the body of the thigh bone, and the trochanter minor had been removed with it. Union had taken place between the fractured portions of the trochanter, at a slight distance from each other, and thus a hollow was left into which the cervix femoris was received, but it had not been united by ossific deposit, as it became loose from the maceration.

Mr. Oldnow's Cases.—Mr. Oldnow of Nottingham sent me two specimens of this fracture, in which the necks of the bones were fractured at their junctions with the trochanter major. The trochanter major itself had been broken off, and the trochanter minor formed a distinct fracture. The bones had become re-united, the cervix femoris to the shaft of the bone, and the trochanter minor a little higher than its natural attachment. The trochanter major was in one specimen reunited to the body of the bone, but not in the other. Thus the thigh-bone was at its upper part divided into four parts ; the head and neck of the bone formed one part ; the trochanter major a second, the trochanter minor a third, and the body of the bone the fourth.

Thus this fracture unites by bone in a similar manner to the fracture of other bones external to the capsular ligaments, because the bones can be brought into apposition, and are confined together by the surrounding muscles, and the nutrition of each extremity of the bone is well supported by the vessels which proceed to it from the surrounding parts.

Difference of Opinion accounted for.—This in some measure explains the difference of opinion respecting the union of the fracture of the neck of the thigh-bone. In the internal fracture, the bones are not applied to each other, and the nutrition of the head of the bone being imperfect, no ossific deposit is produced ; but in the external injury, the bones are held together by the pressure of the surrounding soft parts, and are easily kept in apposition by external bandages and splints. Generally a long period is required to produce a perfect union in these cases, and many months elapse before the patient acquires a free use of the limb.

FRACTURE THROUGH THE TROCHANTER MAJOR.

Nature of.—An oblique fracture sometimes occurs through the trochanter major, without any injury to the cervix of the thigh-bone. This accident takes place at all periods of life, and its symptoms are as follow.

Signs of.—The limb is but little shortened, and sometimes its length is not altered ; the foot is generally benumbed ; the patient cannot turn himself in bed without assistance, and any attempt to do so creates

excessive pain. The portion of the trochanter connected to the shaft of the bone, is either drawn forwards towards the ilium, or it falls towards the tuberosity of the ischium, being, in general, widely separated from the superior portion, or that which remains connected to the neck of the bone. The foot is greatly everted, and the patient is unable to sit on account of the violent pain produced by the position. From the separation of the fractured extremities of the bone, crepitus cannot often be detected, unless the limb be very freely moved.

Most important Signs.—The eversion of the foot, and the altered position of the trochanter major, are the chief distinguishing marks of the injury:

Union by Bone.—Ossific union readily takes place in these cases, more quickly than in the fracture through the cervix femoris, and the patient recovers a very good use of the limb.

Cases.—The first case which I recollect seeing of this injury, was about the year 1786, in St. Thomas's Hospital, under the care of Mr. Cline. The limb was extended over a pillow, rolled under the knee, and splints were applied on each side of the limb; a firm union took place, and the man was able to walk extremely well. After being dismissed from the hospital, he was attacked with fever, of which he died. On examining the seat of injury after death, the fracture which had extended through the trochanter major, was found firmly united with very little deformity.

The following are the particulars of a case which I attended with Mr. Harris, of Reading.

July 20th, 1821, Mr. B., aged 51, a gentleman residing about six miles from Reading, fell from his horse, and injured his left hip; he got up immediately, and walked a few steps, but soon found that he was incapable of bringing his left leg forward, and he felt a severe pain in the hip. He was conveyed home in a cart, a distance of about four miles, and Mr. Harris visited him about two hours after the accident, when the following circumstances were noticed. He could not discover any crepitus on rotating the limb; it was of equal length with the sound one; the foot was not turned inwards or outwards, and the patient could retain it in any position in which it was placed. A good deal of swelling existed about the hip, and Mr. B. complained of some pain; he could bear the limb to be moved without much increase of suffering, excepting when the injured limb was drawn across the sound one, when the pain was greatly augmented. Under these circumstances, Mr. Harris gave it as his opinion, that there was not either a fracture or a dislocation.

On the 22d, Mr. Ring, of Reading, saw Mr. B., and on examining the limb, confirmed the opinion of Mr. Harris.

The patient was kept at rest, and leeches, with evaporating lotions, were employed to reduce the swelling of the hip.

On the 26th, an acute attack of hepatitis, rendered active treatment necessary; and, during this time the limb remained much in the same state.

August 14. Mr. Ring again examined the limb, and whilst moving it, thought he felt a crepitus. On the following day, Mr. Harris also felt and heard the crepitus.

The case being, however, still obscure, Mr. Brodie was sent for; on his arrival, the particulars of the cases were communicated to him, and he minutely examined the injured limb, but for some time was doubtful as to there being a fracture, until, upon rotating the limb very extensively, he distinctly felt the crepitus; he was, however, much surprised to see, that the patient could, when standing, bear very considerably upon the injured limb, and he considered the case as very obscure, the usual symptoms of fracture, except the inability to move the limb, being but little marked or entirely wanting.

Mr. Brodie applied a long splint, with a bandage from the toes to the hip, which he directed to be worn for a month; and at the same time, ordered the limb to be kept perfectly at rest.

But little alteration having taken place in the case at the end of the month, Sir Astley Cooper was requested to visit Mr. B. After hearing the history of the case, he proceeded to examine the limb. First, looking to the relative position of the extremities, as the patient lay upon his back, he placed his hand under the trochanter major, which he found had dropped from its natural situation, and raising it towards the cervix, he readily detected the crepitus, and agreed with Mr. Brodie and Mr. Harris, as to the nature of the injury, viz., a fracture of the cervix femoris, where it unites with the trochanter major.

The following plan of treatment was adopted by Sir Astley, with a view of retaining the trochanter in its proper position, whilst the patient could remain perfectly at rest in the horizontal posture.

A mattress was made of horse hair, about five inches thick, very smooth, and this was covered with a sheet. A part of the mattress was made to draw out on the opposite side to the fracture, so that when the natural evacuations took place, there still should be no motion of the body; before drawing out the piece of mattress, a board of two feet long, and six inches wide, shaped like a wedge, was insinuated under the buttock of the right side, the two ends of the board resting on the mattress, thereby preventing the nates from sinking, at all, into the opening, when the piece of mattress was removed the board was of course taken away, when the portion of the mattress was replaced. Upon the bedstead was first placed a thick smooth board, sufficiently large to cover the bottom of the bed, and on that was placed the mattress, thereby preventing any sinking by the weight of the body.

A bandage, made in the following manner, was applied to support the trochanter:—a broad web, sufficient to go round the body, over the hip, was furnished with two straps and buckles to fix it with, and the belt was made of a greater width at that part, which was to be placed under the injured trochanter; the whole was lined with chamois leather, and stuffed; a pad of the same leather was made, about six inches long, three broad, and three thick, gradually tapering

to a point; this pad was placed immediately under the injured trochanter, so that when the bandage was buckled on, it passed into the hollow beneath that process, forcing it upwards and forwards into its natural position. Another thick pad, about eight inches square, of a wedge shape, was provided, and this was placed under the upper part of the thigh of the injured side, after the application of the bandage.

The patient was placed on his back, the limb resting on the heel; and to prevent the possibility of any motion of the foot, and of the body, a wide board was fixed to the bed posts, at the foot of the bed, with two pieces of wood padded and fastened to it; between these the foot was received, and the least lateral motion prevented. A cushion was placed between the foot board, and the sole of the sound foot, so that by gentle pressure, the patient could prevent his body from slipping down in the bed.

This mode of treatment was steadily pursued for a month, without much inconvenience or suffering to the patient: the bandage being from time to time tightened. Until the expiration of three weeks, the patient said he could occasionally still feel the crepitus, but after that period, this sensation entirely disappeared; he complained of some pain in the direction of the trochanter, and the limb became somewhat œdematous.

Sir Astley Cooper again visited Mr. B. a little more than a month from his first seeing him, when he was of opinion that union had begun, and directed a continuance of the same treatment, which was therefore persevered with for a further period of about ten weeks; Sir Astley seeing the patient once in this time.

It was not until fourteen or fifteen weeks from the commencement of this treatment that the bandage was removed for more than a few minutes, or that any material alteration was made in the plan. It was then taken off for about two hours; when the trochanter was found to retain its position, and from examination of the parts, a considerable thickening could be discovered about the trochanter.

After this, Sir Astley desired that the bandage should be re-applied every day for an hour, and directed friction to the limb from the foot upwards. Mr. B. from this time, rose every day, and was soon able, when supported by his crutches, to move his hip joint freely; but the limb continued much swollen, and the motions of the knee joint were extremely limited. By steadily persevering with friction, and passive motion, Mr. B. has since obtained a free use of the extremity.

Fracture of Trochanter.—A peculiar form of fracture of the trochanter major, in which this process was separated at the part at which it is naturally united by cartilage as an epiphysis, occurred under the care of Mr. Key.

Case.—The patient, a girl about sixteen years of age, fell in crossing the street, and struck her hip against the curb-stone. She rose directly, and walked home without much suffering or difficulty, but experiencing afterwards considerable pain, she was taken to Guy's

Hospital on the sixth day after the accident. On account of her constitutional symptoms being much more severe than those usually attending injury to the hip, she was placed under the care of Dr. Bright, at whose request Mr. Key examined the limb, which he found considerably everted, and in appearance about half an inch longer than the sound extremity; it could be moved in all directions, but abduction caused great pain; not any crepitus or displacement could be discovered, and her having walked both before and after her admission into the hospital, gave rise to a supposition that fracture did not exist. Her constitutional suffering rapidly increased, accompanied with general uneasiness about the abdomen, and she died on the ninth day from the receipt of the injury.

After death, Mr. Key first examined the seat of injury externally, with attention, but could not discover any deviation from the natural state.

Dissection.—On exposing the capsule of the joint afterwards, a cavity was discovered by the side of the pectineus muscle, passing backwards and downwards towards the trochanter minor, and containing some pus; it extended behind the bone to the large trochanter. On cutting through the ligaments, and dislocating the head of the bone, a fracture was first perceived at the root of the trochanter major. This fracture had separated the trochanter from the neck and body of the bone, without the tendons attached to the outer side of the process having been injured, so that a separation of the fractured portions could not take place, on which account the nature of the accident had not been detected during the life of the patient.

OF FRACTURES BELOW THE TROCHANTER.

Difficult to Manage.—When the thigh bone is broken just below the trochanter major and minor, much difficulty exists in effecting a good union, and if the treatment be ill-managed, great deformity is the consequence. The fractured extremity of the superior portion of the bone is drawn upwards and forwards by the action of the psoas, iliacus internus, and pectineus muscles, and any attempts by pressure to obviate this position of the bone, only increases the suffering of the patient, without effecting the desired purpose.

Treatment.—In the treatment of such a case, two principal circumstances require attention: first, to elevate the knee, by placing the limb over a double inclined plane, and secondly, to raise the body so as to place the patient in nearly a sitting position; the degree of elevation of the limb or of the body must depend on the approximation of the fractured ends of the bone, and the surgeon must carefully ascertain that the proper relative position of the femur is restored, before he proceeds to apply the splints and bandages to retain them in this state. A strong leather belt lined with some soft material, and made to buckle round the limb, answers better in these cases, than the common splints.

Specimen of.—A preparation in the museum at St. Thomas's Hospital exhibits the mode of union in an ill-treated case of this kind, and illustrates the necessity of careful attention to the points I have mentioned, viz. : the relaxation of the psoas, iliacus internus, &c. by elevating the body, and the raising of the inferior portion of bone to a line with the superior.

LECTURE XLIV.

OF DISLOCATIONS OF THE KNEE.

Structure of Joint.—THE frequent and great violence to which this joint is exposed, also the form of the articulation, the cavities on the head of the tibia being very shallow, would render it extremely liable to displacement, were it not for the extent of articulating surface, and the existence of numerous strong ligaments, which connect the os femoris, the tibia, and the patella.

Dislocations do, however, sometimes occur from excessive violence, or from great relaxation of the connecting ligaments.

OF DISLOCATION OF THE PATELLA.

Three Forms of.—The patella may be dislocated in three directions ; —viz., outwards, inwards, and upwards.

External.—The external displacement is the most common ; in which case the patella is thrown upon the outer condyle of the os femoris, where it occasions a great projection, which circumstance, and the incapacity of bending the knee joint, sufficiently mark the nature of the injury.

Cause of.—Persons who have naturally an inclination of the knee inwards, are most liable to this injury, and it is usually produced by a fall at the time that the knee is turned inwards and the foot outwards, so that the action of the muscles, in endeavouring to prevent the fall, draw the patella over the external condyle of the thigh bone.

Internal.—The displacement of the patella upon the internal condyle, is much less frequent, and generally happens from a fall upon a projecting body, by which the patella is struck upon the outer side, and forced inwards at the time that the foot is turned in the same direction.

Ligament Torn.—Unless the ligament has been relaxed from previous disease, it will be torn in either of these dislocations.

The reduction, in either case, may be accomplished in the following manner :—

Treatment.—Place the patient in the recumbent posture, and let the leg be raised, by lifting it at the heel, so that the extensor muscles of the thigh may be relaxed as much as possible ; then press down firmly the edge of the patella, furthest from the articulation, by which the opposite edge will be raised over the condyle, when the action of the muscles will quickly restore the bone to its natural situation.

Case.—The following plan was adopted by Mr. George Young, in a case of the external dislocation, which he could not succeed in reducing by other means. He placed the ankle of the limb upon his shoulder, which gave him considerable power in extending the knee joint ; when grasping the patella with the fingers of his right hand, he pressed the outer edge of the bone with the ball of his left thumb, and thus forced it into its place.

After-treatment.—After the reduction, the limb must be kept at rest, and the part kept moist with an evaporating lotion ; after three or four days, bandages may be employed. The motions of the joint are soon restored, but a degree of weakness remains for some time.

From Relaxation.—Very slight causes produce the lateral dislocation, when much relaxation exists, but the reduction is very easily accomplished, and it is necessary to employ a laced knee cap, with a strap and buckle above and below the patella, to prevent a recurrence of the accident.

OF THE DISLOCATION OF THE PATELLA UPWARDS.

Nature of.—In this displacement, the ligamentum patellæ is torn through, and the patella is drawn upwards upon the fore part of the thigh bone.

Signs of.—The nature of this injury is extremely well marked, by the elevation of the patella, the freedom of its motion laterally, and the depression above the tubercle of the tibia from laceration of the ligament : the patient cannot support himself upon the limb, as the knee immediately bends when he attempts to do so. The accident gives rise to a considerable degree of inflammation.

Treatment.—The treatment required for this injury, in the first place, will be to reduce the inflammation, by the application of leeches and evaporating lotions, at the same time that the limb is kept extended, and the body elevated, to relax the muscles, and prevent as much as possible the elevation of the patella ; after from four to seven days, a roller should be placed upon the limb, from the toes to the knee, to prevent swelling, and a splint should be fixed behind the knee, to prevent any motion of the joint ; a leather strap should then be buckled around the lower part of the thigh, just above the patella, and to this should be attached another strap, which should pass on each side of the leg, under the foot, by which the circular strap may be drawn

down so as to restore the patella as near as possible to its natural position, and thus approximate the lacerated ends of the ligament, to allow of union.

With attention, Union perfect.—With great attention, the union will be perfect ; passive motion may be carefully employed at the expiration of a month.

Degree of Recovery.—The degree of recovery depends upon the length of the ligamentous union, being perfect when the lacerated extremities are kept in contact during the union, and the powers of the limb being diminished in proportion to their separation.

Dislocation Downwards.—A dislocation of the patella downwards has been mentioned by some surgeons, but I have not seen any injury deserving such a title. Sometimes the tendon of the rectus muscle is torn through, in which case a depression can be felt above the patella, but the bone itself retains its natural situation. The same position of limb and body is necessary in the treatment of this injury, as in the dislocation upwards, and a pad should be applied over the ligamentum patella, and confined there by a roller.*

OF DISLOCATION OF THE TIBIA AT THE KNEE JOINT.

Four Forms of.—The superior extremity of the tibia may be displaced in four directions, viz. : outward, inwards, backwards, and forwards, but only the two latter are complete dislocations, as in the two former instances the articular surfaces of the tibia, and of the condyles of the os femoris are still partly in contact.

These lateral dislocations occur but seldom.

Inwards.—When dislocated inwards, the head of the tibia forms a large projection on the inner side of the joint, the internal condyle of the femur rests upon the external semilunar cartilage, and the external condyle projects to the outer side.

Case.—The first case of this injury which I recollect seeing, was brought into St. Thomas's Hospital, during my apprenticeship there, when I remember being struck with three circumstances respecting it ; first, the great deformity of the joint—second, the little force necessary to reduce the displacement—third, the slight degree of local or constitutional suffering which followed, the recovery being complete in a few weeks.

Outwards.—When displaced outwards, the tibia projects upon the outer part of the joint, the internal condyle upon the inner side, and the external condyle rests upon the internal semilunar cartilage, the deformity produced being as great as in the former case.

* In a case of this nature, which came under my care in St. Thomas's Hospital, I found considerable advantage from the application of a pad over the upper portion of the rectus muscle, it was confined by a roller, and assisted materially in approximating the lacerated ends of the tendon ; the patient recovered with perfect use of the limb.—T.

Reduction.—The reduction in either instance may be readily effected by direct extension, and but little diminution of power in the joint follows. I believe that, in both these dislocations, the tibia is rather twisted upon the femur, than forced merely inwards or outwards, so that the condyle of the os femoris is thrown somewhat backwards with respect to the head of the tibia, as well as laterally.

After-treatment.—When the patient is first allowed to use the limb after an accident of this kind, the joint should be supported by a bandage or a knee cap, as from the injury to the ligaments, it remains feeble for some time, although the recovery ultimately is nearly perfect.

DISLOCATION OF THE TIBIA FORWARDS.

Signs of.—When this accident occurs, the following appearances will be presented, when the patient is in the recumbent position. The head of the tibia projects forwards, and the inferior part of the thigh bone is depressed, being thrown a little to one side as well as backwards: the patella is drawn up by the action of the rectus muscle. The circulation through the popliteal vessels is obstructed by the pressure of femur posteriorly, so that arteries below cease to pulsate, and the foot feels numbed from pressure upon the nerves.

Case.—A man named Briggs was admitted into Guy's Hospital, in the year 1802, under the care of Mr. Lucas. He had a dislocation of the tibia forwards, in one extremity, which presented the marks I have described, and a compound fracture of the tibia, with a dislocation of the head of the fibula existing in the opposite limb. The extent of mischief attending the compound fracture, rendered it necessary to amputate that extremity. The dislocation in the other extremity was easily reduced, by extending the thigh from above the knee, and by drawing the leg from the thigh, inclining the tibia a little downwards. The patient recovered.

DISLOCATION OF THE TIBIA BACKWARDS.

Signs of.—This injury occasions the following marks. A projection of the condyles of the os femoris anteriorly, a depression of the ligamentum patellæ, the head of the tibia is seated behind the condyles, and the limb is shortened, the leg being bent forwards. My friend, Dr. Walsham, sent me the following particulars of a case which was under his care.

Case.—Mr. Luland, a very robust and muscular man, had his shoulder and knee dislocated in consequence of being thrown from his cart, in January 1794. The head of the tibia was completely dislocated backwards, reaching behind the condyles of the femur into the ham; the tendinous connexion of the patella to the rectus muscle was ruptured;

the external condyle of the os femoris was very protuberant; the leg was bent forward and shortened, and there was a depression just above the patella. The patient felt most excruciating pain when the limb was moved, but there was not any considerable suffering when it was at rest. It was reduced by the following means:—Two men extended upwards, one from the groin, another from the axilla, whilst two others extended the leg from a little above the ankle, in the opposite direction; and they gradually increased the force of their extension, till the bone was reduced. At the time of extension, Dr. Walsham directed the head of the bone to its natural situation. A roller was afterwards placed over the knee, the limb was laid upon a pillow, and an evaporating lotion was constantly applied. In this state, the patient remained for a fortnight free from pain, when the Doctor gently moved the joint every other day, as far as he could, without creating pain. In about a month, Mr. Luland began to walk on crutches, in ten weeks he was able to sit at the dinner table, and in five months had perfectly recovered the use of his limb.

OF PARTIAL LUXATION OF THE THIGH BONE FROM THE SEMILUNAR CARTILAGES.

Reason of.—The ligaments of the knee joint sometimes become so much lengthened from extreme relaxation, or from an increased secretion into the joint, as to permit the semilunar cartilages to glide upon the surface of the tibia, when pressure is made by the femur on the edge of the cartilage.

First described by Mr. Hey.—The nature of the accident was first accurately described by Mr. Hey, of Leeds, who was so justly celebrated for his high professional attainments; he also suggested an ingenious and scientific mode of treatment, which is generally successful.

Causes of.—The displacement is most frequently occasioned by a person when walking catching the toe against some projecting body; whilst the foot is everted, pain is immediately felt in the joint, and the limb cannot be straightened. I have known it also produced by the bed clothes obstructing the motion of the foot, when a person has been turning in bed. The explanation of the accident is as follows:—

Explanation of.—The semilunar cartilages which receive the condyles of the femur, are united to the tibia by ligaments; and when these ligaments become extremely relaxed or elongated, the cartilages are easily pushed from their situation by the condyles, which are thus placed in contact with the head of the tibia, and when an attempt is made to extend the limb, the edges of the semilunar cartilages prevent it.

Reduction.—The mode of reduction is, to bend the limb as much as possible, so as to enable the cartilage to slip into its natural position from the pressure of the femur: the cartilage being thus

replaced, the limb can be again properly extended, and the condyles are again received upon the cartilage.

I have, however, known this plan to fail in effecting the desired object, as the following case will show.

Case.—A lieutenant in the army, who had been repeatedly the subject of this injury, and who had been as often relieved by the means above recommended, had a recurrence of the accident, whilst turning in his bed; he came to town, but the former mode of treatment, although repeatedly tried, did not succeed in reducing the dislocation; he afterwards went to Mr. Hey, of Leeds, but without obtaining relief.

After-treatment.—A knee cap, made to lace closely upon the joint, will generally prevent any further displacement; but, in some cases, this is not sufficient.

Cases.—Mr. Henry Doble consulted me, in consequence of his suffering frequently from this accident, which could only be prevented by the addition of straps to the knee cap, one of which, of considerable strength, passed just below the patella.

In another case, that of a young lady, also frequently the subject of this dislocation, the accident could only be prevented by a linen bandage, having four rollers attached to it, which were tightly bound above and below the patella.

Effects of.—I have seen some cases of this kind, in which a very great alteration has taken place in the form and size of the joint in consequence of a chronic inflammation attending them. The following is an account of one:—

Case.—Lady D. in falling, twisted her thigh inwards, so as to occasion great pain in the knee joint. On attempting to extend the limb, she could not move the knee joint; but after pressing the thigh outwards and leg inwards, with some force, she found herself capable of straightening the extremity. For a fortnight after the accident, the joint was extremely weak, and she could hardly bear it to be moved. She then began to stand upon the limb, supporting herself by crutches; but when she bore much upon the injured limb, it suddenly bent back, and this produced considerable pain and swelling, at the time she felt the condyles slip from the semilunar cartilages upon the head of the tibia. This occurred repeatedly during a period of fifteen months after the accident, and each time greatly retarded her recovery. Three months after this, she had so far improved, as to be able to walk with the aid of a stick only, when, in endeavouring to raise herself from a sofa, her left knee gave way, as if the bone had slipped from its place; the thigh bone being at the same time twisted outwards; this produced great pain and swelling, and she was again unable to stand upright. Her joints were all remarkably flexible, and when a girl, she often experienced a sensation of having dislocated her knees, but from this she soon recovered. When I saw her, both knees were much enlarged from effusion of synovia into the cavities of the joints; she could not stand without support, and was unable to straighten the

limbs. To relieve her, blisters were applied, and for some time kept discharging ; after they were allowed to heal, pressure was employed by means of bandages, which were occasionally removed to allow of friction. She derived most benefit from the internal use of the pilul : hydrarg : submuriat : comp : and the decoct : sarsaparillæ comp : and externally from the friction.

Dissection of these Joints.—In the dissection of these cases, the ligament is found extremely thickened ; small ligamentous and cartilaginous bodies are hanging from it ; part of the articular cartilage is absorbed, and part presents a thick projecting edge. After maceration, the edges of the condyles are found to be much increased by deposit of bony matter.

OF COMPOUND DISLOCATIONS OF THE KNEE.

Very Rare.—This accident is of very rare occurrence ; I have only once seen such a case, which required immediate amputation ; and I scarcely know any form of injury which would so urgently call for operation.

Case.—On the 26th of August, 1819, I was sent for by Mr. Oliver, of Brentford ; to see a Mr. Pritt, in consequence of severe injury to the knee, occasioned by a fall from the coach box of one of the mails. On examining the limb, I found a large aperture in the integuments, on the outer side of the knee joint, through which the external condyle of the femur projected, so as to be on a level with the edges of the skin. The inferior part of the os femoris was thrown behind, and to the outer side of the head of the tibia, the bone was twisted outwards, so that the internal condyle was situated upon the head of the tibia, whilst the external condyle was turned backwards and outwards. We succeeded in replacing the bones with much difficulty, but as soon as the extension ceased, they returned to the same position as I have above described.

In consequence of the great severity of the injury, the difficulty of retaining the bones in their natural situation, and the patient being of a very irritable disposition, I immediately proposed and with his consent performed the operation of amputation. Great constitutional suffering followed the operation, but under the judicious treatment of Mr. Cline, who visited him during my absence from town, he gradually recovered.

Dissection.—On dissecting the limb after the operation, I found great extravasation of blood into the cellular tissue surrounding the joint ; the vastus internus was extensively lacerated, just above its connexion with the patella ; the tibia projected forwards, and the patella was situated to the outer side of the knee. On the posterior part, both the heads of the gastrocnemius externus muscle were torn through, and the capsular ligament so completely divided, as to admit both the condyles of the femur through it.

Attempt to save the Limb.—Should a case of compound dislocation of the knee occur, in which a very small wound only existed, admitting of ready closure, it would be right to attempt the preservation of the limb.

OF DISLOCATIONS OF THE KNEE FROM ULCERATION.

Cause of.—From the chronic diseases of joints, not only the synovial membrane and articular cartilages suffer from ulceration, but in some cases the capsular, and also the peculiar ligaments become ulcerated, so that the connexion between the bones is in a great measure destroyed, when the muscles which participate in the irritation, contract and gradually displace the bones, producing great distortion of the limb.

This is most frequently seen in the hip-joint; but it is not uncommon to find at the knee the tibia drawn out of its proper line, with respect to the femur from the same cause.

Extraordinary Distortion.—*Case.*—Occasionally, the distortions thus produced are very remarkable. Mr. Cline amputated a limb in St. Thomas's Hospital, in which the following alteration had taken place from chronic disease in the knee-joint. The leg was placed forwards, at right angles with the thigh, so that, prior to the operation, it projected before the patient when he was standing. On examining the joint, the patella was found ankylosed to the femur, as also the tibia to the fore part of the condyles of the thigh-bone.

Mode of Preventing.—Much may be done in the early stage of this disease, to prevent deformity, by the application of splints, and the use of internal remedies, as the pulv : ipecacuanhæ comp : to diminish general irritability.

OF FRACTURES OF THE KNEE-JOINT.

I shall now proceed to describe the fractures which occur in the bones forming the knee-joint.

FRACTURES OF THE PATELLA.

Forms of.—The most common fracture of this bone is transversely; sometimes, however, it is broken longitudinally; these fractures may be either simple or compound, but the latter rarely happens.

Transverse.—When fractured transversely, the superior portion of bone is separated from the inferior being drawn up by the action of the rectus vasti and crureus muscles, which are inserted into it. The lower portion of the bone remains in its natural situation, connected to the ligamentum patellæ.

Extent of Separation.—The degree of separation will be found to vary from half an inch to five inches, and it depends upon the extent of laceration of the capsular ligament, and tendinous aponeurosis covering it.

Signs of.—The nature of the injury is readily recognized, on examination, by the fingers, when pressed between the two portions of the bone, sinking nearly to the condyles of the femur; by the situation of the upper portion of bone, and by its free lateral motion upon the fore and lower part of the thigh-bone; the patient cannot extend the limb, nor can he support the weight of the body upon it when standing, as the knee immediately bends forwards from the loss of the support of the extensor muscles. The injury, if simple, is attended with but little pain, and is not productive of much constitutional suffering.

Consequent Swelling.—A few hours after the receipt of the accident, the part becomes tumid from extravasation of blood, and the surface presents a discoloured appearance from ecchymosis; this, however, subsides in a few days, but the joint enlarges from an increased secretion of synovia, and from effusion in consequence of inflammation. As the portions of the bone are separated, no crepitus can be felt, as is usual in other fractures.

Causes.—Two causes are found to produce this injury:—First, falls upon the knee, or blows upon the patella, when the patient is erect. Second, the action of the extensor muscles upon the bone, in any sudden effort to prevent a fall.

Cases.—I was called to attend a gentleman, who had fractured his patella by an effort he made to save himself from falling, after having leaped over a broad ditch.

I also saw a lady, who met with the same accident in endeavouring to save herself from a fall, when descending some stairs, having placed her heel too near to the edge of one of the steps.

Explained.—It may appear extraordinary, that the action of the muscles alone is sufficient to produce fracture, but a little attention to the structure and mode of action easily explains the fact. When the knee is bent, the patella is drawn down on the end of the condyles of the femur, and the upper edge of the bone projects forward, so the muscles do not act in a line with the patella, but at right angles with it, and more particularly upon its upper portion.

Mode of Union.—The union in these cases is generally ligamentous, whether the portions of the fractured bone be nearly approximated, or widely separated. Soon after the accident, blood is poured out, and fills the space between the lacerated ligament and broken pieces of bone, but this soon becomes absorbed, and its place is occupied by adhesive matter thrown out in consequence of inflammation; this soon becomes organized by vessels from the edges of the injured ligament, and a structure, similar in its character to ligament, is thus produced, by which the parts divided by the injury are again united. Sometimes this new structure does not completely fill up the space formed by the separation of the portions of bone and ligament, but it has apertures in

it ; but this most frequently occurs when the separation is very great, or when the limb has been moved too soon after the accident.

Dissection.—On examining the seat of injury, some time after the accident, I find that the patella itself undergoes but little change, the inferior portion has its broken surface very little altered, being only rather smoothed ; the upper portion has its fractured surface covered with some ossific deposit, so that there is more ossific action in the superior than in the inferior portion of the bone. The articular surface maintains its natural appearance.

Experiment.—By experiments on the rabbit, I have been able to trace the mode in which this injury is repaired ; in each experiment I divided the patella, by placing a knife on the bone, and striking it gently with a mallet, having first cut through the integuments, which I drew as much as possible to one side, so that when allowed to resume their natural situation after the division of the patella, the wound was not opposite the fracture.

Appearances Forty-eight Hours after.—Examining the parts forty-eight hours after the division, I found the portions of bone separated to the extent of three quarters of an inch, and the intervening space filled with coagulated blood.

Eight Days after.—In a second experiment, examined eight days after, most of the blood was absorbed, and adhesive matter deposited in its place.

Fifteen Days after.—A third, examined on the fifteenth day, the adhesive matter had become smooth, and somewhat ligamentous.

Twenty-two Days after.—A fourth, examined on the twenty-second day, the new ligament was perfect.

Five Weeks after.—A fifth, examined at the expiration of five weeks, and injected, showed the organization of the new ligament which was chiefly supplied by vessels from the original ligament, and by a very few vessels from the bone.

Union by Ligament.—In repeating these experiments upon the rabbit and dog, I could not succeed in producing a bony union, although I could keep the fractured pieces in perfect contact.

Bony Union.—I believe, however, that ossific union may now and then be produced ; in a case which I saw with Mr. Chopart at Paris, there was every appearance of such a junction, and Mr. Fielding of Hull has published another case.

Although in a large majority of these cases, I believe the union to be ligamentous, yet it is extremely desirable to make the ligament as short as possible, as the degree of recovery of the power of the limb is in proportion to the approximation of the fractured portions of the patella, or according to the shortness of the new ligament, for as the superior portion of the bone is separated from the inferior by the action of the rectus muscle, so the muscle becomes shortened, and its power consequently diminished. When, therefore, the intervening ligament is very long, the person cannot walk fast without a halt, and is in constant danger of falling.

Treatment.—In the treatment of the transverse fracture of the patella, the patient should first be placed in bed upon a mattress, with the injured limb extended, behind which a hollow splint, well padded, should be applied ; the heel should be elevated a little, and the body raised, in order to relax, as much as possible, the rectus muscle, and thereby prevent it from drawing up the superior portion of the fractured bone. The limb should be fixed to the splint to prevent its slipping, and the surface of the joint should be kept constantly moist, with an evaporating lotion. If there be much tension or pain succeeding the injury, the application of leeches will be necessary, with a continuance of the evaporating lotion. In a few days, the swelling and pain will subside, under this plan of treatment, after which the bandages may be applied to approximate the portions of bone. The surgeon should be very careful not to apply the bandages before the tension has been reduced ; I have known severe suffering and inflammation produced by their too early application, so much so in some cases as to threaten a sloughing of the integuments.

Common Bandage.—The most common mode of using the bandages is as follows : a roller is first applied from the toes to the knee, to prevent swelling of the leg ; two pieces of broad tape are then placed on each side of the patella, in the direction of the limb, and two rollers are next bound round the extremity, one above, and the other below the knee joint, confining the pieces of tape, and having the two portions of bone between them ; the ends of the tape on each side are afterwards turned over the rollers, and tied so as to bring the rollers nearer to each other, and thus press the portions of the fractured bone as near as possible together ; the splint is again applied and fixed to the limb, to prevent any flexion of the joint, the heel is still raised, and the body supported nearly in the sitting posture.

Another Mode.—I usually adopt a mode rather different, which I think preferable, and which consists in buckling a leather strap around the lower part of the thigh, immediately above the superior portion of the patella, and having another strap attached to the former on each side, long enough to pass under the sole of the foot, by which the circular strap can be drawn down, and with it that part of the broken bone connected to the tendon of the rectus muscle ; the splint and the position are attended to as above mentioned.

Period of Confinement.—It is necessary in the adult to continue this treatment for five weeks, and in elderly persons for six weeks, before any motion is allowed ; it may then be employed passively, but very cautiously, until it be ascertained that the union is sufficiently firm to bear it without risk, when it may be continued from day to day until the joint can be completely flexed.

Passive Motion essential.—Passive motion is very essential to promote the return of power in the muscles and joint, as without it many months will elapse, and the patient still be incapable of flexing the limb. When passive motion is to be employed, the patient should be seated upon a high stool or table, in such a manner that the edge of the

seat reaches as far as the ham, so that the leg can be depressed without the thigh; this is to be done with considerable care at first, until a slight degree of motion has been acquired, when the patient may, by swinging the leg, and directing his mind to the contraction of the rectus and exterior muscles, gradually restore the functions of the joint. If the union has taken place with a shortened state of the rectus muscle, and the portions of bone are joined by a long intervening ligament, the muscle does not recover its voluntary power until it has been again elongated, which is done by bending the knee.

Case.—A young woman who had suffered from transverse fracture of both patellæ, was brought to my house in consequence of not having recovered any power of flexing the limbs. Passive motion was employed, and she was directed to extend the limbs, when they had been flexed by the surgeon; in this manner, after persevering for some time, she gradually recovered the use of the joints. The pain created by the passive motion, and the very gradual benefit derived from it, make patients averse to its continuance, but it is perfectly essential to recovery.

OF THE PERPENDICULAR FRACTURE OF THE PATELLA.

This injury, as the former, is attended with considerable effusion and swelling of the soft parts.

Union by Ligament.—Having seen several cases in which the union had only been effected by ligament, and not being aware of any circumstance that should prevent ossific junction, I made several experiments upon dogs and rabbits, the result of which was as follows :—

Experiment.—Having produced fractures in a manner somewhat similar to that already described, for occasioning the transverse division of the bone, sufficient time was allowed for the process of cure to be completed, when the bones were examined, and found to be joined only by ligament, and the two portions considerably separated from each other, from the pressure of the condyles of the femur upon the inner surface of the patella when the knee was bent.

I therefore made another experiment, and divided the patella in a dog, but in such a manner, that the tendon above, and the ligament below, remained uninjured, so that there could be no separation of the fractured portions; in this case, I found that a perfect ossific union took place.

Union by Bone—It appears, then, that in either the longitudinal or transverse fractures, when the portions of bone are separated, that a ligamentous union takes place; but if these portions remain in contact, that they may be united by bone.

Case.—Mr. Marryat had his patella broken into three portions, by a fall from his gig; the bone was divided by a transverse fracture, and the lower piece again divided by a perpendicular fracture; the

transverse fracture united by ligament only, whilst the perpendicular fracture joined by bone.

Experiment.—I fractured the patella of a dog, separating it into four portions by a crucial division, no union took place between the two superior pieces, neither to each other, nor to the inferior, but the inferior portions became united to each other by bone.

Treatment.—The treatment of this accident, consists in placing the limb in an extended position, with a padded splint posteriorly, to prevent any motion of the knee joint; in applying an evaporating lotion until the swelling and pain have subsided, after which, a knee-cap padded on each side of the patella should be buckled around the joint, the straps passing above and below the patella.

OF COMPOUND FRACTURE OF THE PATELLA.

Extent of Mischief.—When this accident is attended with extensive laceration, and much contusion of the surrounding soft parts, it will be right immediately to amputate the limb; but should the wound be small, so that its edges can be readily approximated, and not accompanied with such mischief as is likely to occasion sloughing, an attempt should be made to preserve the extremity.

Treatment.—The principal object in the treatment, is to produce adhesion of the edges of the wound; to effect which, all our efforts should be directed. The application of sutures is necessary, not only to assist in the immediate approximation of the edges of the wound, but to prevent their after separation, which is otherwise liable to take place from the escape of synovia, and the lax state of the integument; besides the sutures, strips of adhesive plaster should be placed, and the part kept cool by the evaporating lotion. Poultices or fomentations must not be used, as they prevent the adhesive process.

Cases.—A man in St. Thomas's Hospital, under the care of Mr. Birch, had fomentations and poultices employed, after an injury of this nature, in which but a small wound communicated the joint,—he died in consequence of excessive constitutional irritation, produced by suppurative inflammation, which took place in the joint.

The following case, which was under the care of Mr. Dixon, of Newington Butts, will fully explain the mode of treatment I would recommend.

Mr. Redhead, aged 39, of a spare habit, was thrown from his gig, June 18, 1819, when his knee, striking against the wheel of a cart, produced a compound fracture of his patella. At Mr. Dixon's request, I visited the patient in the afternoon of the day on which the accident had occurred, and on examining the joint, I found a wound on the fore part, which readily admitted my finger into the joint; the patella was broken into several pieces, one of which being detached I removed. From the habit of the patient, and his not having an irritable constitution, we determined on attempting to preserve the limb.

I accordingly brought the edges of the wound together by the application of a suture, taking care not to include the ligament ; I then further secured the closure of the wounds by strips of adhesive plaster, and over the whole I placed a roller very lightly, which was to be kept constantly moistened with spirit of wine and water. The leg was placed in an extended position, and he was ordered to live on fruit. The suture was not removed until the 30th of June, as he did not at all complain. At the expiration of a month, Mr. R. was allowed to leave his bed ; and in five weeks from the accident, passive motion was commenced. He gradually recovered the perfect use of his limb.

In the year 1816, a case happened in Guy's Hospital, in which the knee joint was opened by ulceration, some time after the occurrence of a transverse fracture of the patella, which had united by a ligament about three inches in extent ; the patient, a woman, was admitted into the hospital, in consequence of having numerous ulcers on various parts of her body, one of which was seated in the integument, immediately over the new formed ligament, uniting the broken patella ; this ulcer became sloughy, and extended through this ligament into the joint, in which excessive inflammation and suppuration occurred, which destroyed the patient.

OF OBLIQUE FRACTURES OF THE CONDYLES OF THE OS FEMORIS INTO THE KNEE JOINT.

Signs of.—Either the external or the internal condyle of the femur may be separated by fracture from the rest of the bone, producing much deformity of the knee joint, and giving rise to great swelling, which circumstances, together with the feeling of crepitus when the joint is moved, indicate the nature of the injury. In either case, the same mode of treatment is required.

Treatment.—The injured limb is to be placed upon a pillow in the extended position ; leeches and evaporating lotion are to be employed, until the inflammation is subdued ; after which, a piece of stiff paste-board, about a foot and a half in length, and of sufficient width to envelop the posterior and lateral parts of the knee joint, as far as the sides of the patella, is to be applied wet, and secured by a roller ; this, when dry, adapts itself to the form of the joint, and best confines the fractured portion of bone. In five weeks, passive motion should be employed to facilitate the recovery of the motions of the articulation.

Compound Fracture.—Compound fracture of the condyles of the os femoris is a rare accident ; and in the old, or irritable, is most likely to be attended with fatal consequences, unless the limb be removed. In young persons, or in those not of an irritable constitution, a cure may be effected, unless the opening be very extensive, or attended with surrounding mischief.

Case.—A boy was admitted into St. Thomas's Hospital, in September 1816, under the care of Mr. Travers, having a transverse

fracture of the femur, just above the condyles, and an oblique fracture of the external condyle, with which a small wound communicated; the limb was placed in a fracture box in the semiflexed position. The patient suffered but little from constitutional disturbance, although the integuments over the injured condyle ulcerated, so as to expose the bone, which was removed in November, in consequence of its losing its vitality. After this, the limb was placed in the straight position, as ankylosis was deemed unavoidable, but the lad recovered with a perfectly useful joint.

OF OBLIQUE FRACTURE OF THE FEMUR, JUST ABOVE THE CONDYLES.

Consequence.—The consequences of this injury are often very lamentable, producing great deformity of the limb, and destroying, in a great measure, the motions of the knee joint.

Causes.—The injury is generally produced by a fall from a height upon the feet, or upon the knee when the joint is very much flexed.

Specimen of, examined.—Mr. Paty, surgeon of Bouverie Street, Fleet Street, has a preparation, showing the great deformity consequent on this injury; it was taken from a subject brought into the dissecting-room at St. Thomas's Hospital. Before dissecting the parts, it appeared that the femur had been fractured just above the condyles, and that the inferior part of the superior portion of the bone projected as far as the upper part of the patella, being only covered by the skin; the size of the bone was much increased. On examining the seat of injury, the end of the superior portion of bone was found to have pierced the rectus muscle, through which it continued to project. The patella could not be drawn upwards as it was stopped by the extremity of the bone. The condyles of the femur and the inferior portion of bone had been drawn upwards and backwards by the action of the muscles, behind the inferior part of the superior portion, and had united to it very firmly.

Independent of the deformity in this case, the motions of the knee joint must have been very limited, as the rectus muscle was hooked upon the projecting extremity of bone anteriorly, which also prevented the ascent of the patella.

Best Mode of Treatment.—The best mode of treatment to obviate these great evils, is first to flex the joint as much as possible, to liberate the rectus muscle, at the same time supporting the condyles over some fixed body, to prevent their receding, and afterwards the limb must be firmly extended, to prevent retraction.

The following cases will explain the difficulty of effecting these objects; the first was under the care of Mr. Welbank, junior.

Case.—A gentleman of middle age, a tall and powerful man, was thrown from his gig in June 1821. The medical attendant, who was called to see him, found him lying on a bed, to which he had been carried, with his right leg bent across the left at an angle. At first

view, it appeared that there was a lateral dislocation of the knee, a deep hollow was seen on the outer side, in the situation of the condyles, and above it a sharp projection. On examining more attentively the seat of injury, an oblique fracture of the femur was found just above the condyles; considerable effusion existed in front of the joint, around the patella, which could not be distinctly felt. After the fracture had been reduced, which was readily effected by slight extension, a ridge could be felt just above the patella, which, upon a superficial examination, might have been mistaken for a transverse fracture of that bone. If the limb was flexed, a great deformity resulted from the projection of the upper portion of the fractured bone, which disappeared again on extending the limb. The sensation of crepitus was very indistinct.

The extremity was placed in an extended position, and secured by the application of short splints, for the space of a week, during which time means were employed to reduce the inflammation of a capsule, consequent on the injury. After this, a long splint was applied on the outer side of the limb, from the trochanter major to the foot, and a shorter one on the inner side, from the middle of the thigh to the middle of the leg; these were firmly confined by bandages, and the limb was supported upon an inclined plane. In consequence of frequent variation in the projection of the upper portion of bone, weights were subsequently appended to the foot, to keep up a constant extension, which appeared to be advantageous.

In September following, the union was thought to be sufficiently firm, and the patient was carefully removed to Eastbury, Herts, in a litter-carriage, with his limb still in the same position. It being found, however, that alteration of posture, or any attempt to flex the limb, produced a greater projection at the seat of fracture, the former plan of treatment was continued for another fortnight. Upon a further examination after this period, a degree of lateral motion could yet be felt, and the projection of the fractured bone was still increased by bending the knee, indicating that the union was not yet firm, in consequence of which the limb was again placed at rest, and a circular belt was tightly buckled around it at the seat of injury, to press the fractured parts together, and to maintain them in firm apposition. In the middle of October, the patient was first allowed to get up, the union being then complete, and he has since gradually recovered the use of the limb, so as to be able to walk without assistance, but he has little power of bending his knee, the upper part of the patella being caught against the projecting portion of the femur, which is still evident. The limb is somewhat shortened, and the thigh inclined outwards.

Case.—Mr. Kidd, who was tall, muscular, and in weight fifteen stone, fell from a height of twenty-one feet, and by the severity of the concussion, fractured his thigh bone obliquely, just above the condyles, and the lower part of the superior portion of the bone penetrated through the rectus muscle and integuments, appearing just

above the patella. He was immediately carried home, and I was requested to see him by Mr. Philips, Surgeon to the King's Household, who had been called to him. The projecting extremity of the superior portion of bone was sawn off, and the fracture reduced, when the edges of the wound were carefully brought together, and the limb was placed over a double inclined plane. The wound healed without difficulty, which was extremely favourable. The accident occurred on the 9th of November 1819, and on the 30th, splints were applied to press the bones together. December 23, the limb was placed in an extended position, which was continued until the beginning of February. The patient was then allowed to sit up; but on a careful examination of the limb, the union of the fracture was ascertained not to be complete, and a leather bandage was therefore placed around the injured part, and tightly buckled, to secure the bones in a proper position. On the 3d of May, the union was found to be complete, and a few days after the bandage was removed, the limb being supported by a pillow. He was still unable to leave his bed in consequence of the great swelling of the leg, and some degree of superficial ulceration from the application of the leather bandage. On the 19th of July, he was removed from London to Kensington upon a litter. A considerable period elapsed before the swelling of the limb subsided, or before he was able to be moved to a sofa. At the end of January, he was on crutches for the first time, and took his first walk out of doors, near the close of the following month.

After union was complete, the inferior part of the upper portion of the bone, which had been broken, continued to project, its size was very much increased, and the patella was fixed to its extremity, to which also the skin adhered.

Apparatus for Extension.—I have had an apparatus constructed, which I think better calculated to preserve the limb in a constant state of extension, than that employed in either of the above cases. It consists of a straight splint, long enough to reach from the upper and inner part of the thigh, as far as several inches below the sole of the foot; the upper extremity is hollowed and padded, so as to fit in between the scrotum and thigh, against the side of the pubes; and the lower part resembles that described and employed by Boyer; having a boot which fixes by the sole to a bolt projecting at right angles from the splint; the bolt is connected with a screw, let into the lower part of the splint, and on turning this screw, the bolt is carried upwards or downwards, according as the screw is moved to right or left. After having liberated the rectus muscles from the broken extremity of bone, by bending the knee as before directed, the limb is to be extended, and the apparatus applied on the inner side of the limb, in the following manner:—The upper padded end being placed between the scrotum and thigh, against the side of the pubes; the foot is to be received into the boot, and confined there by closing the front with a lace in the usual manner, or with straps and buckles; then by turning the screw, the bolt connected with the sole of the boot, and consequently the boot and foot are made to

descend : thus a powerful mode of extension is afforded, the upper part of the splint being fixed against the pelvis, the whole force of the instrument is exerted upon the limb.

OF FRACTURE OF THE HEAD OF THE TIBIA.

Nature of.—A fracture sometimes occurs obliquely through the head of the tibia into the knee joint, in which a mode of treatment very similar to that recommended for the oblique fracture of the condyle of the femur is necessary ; viz., an extended position of the limb, in which the extremity of thigh bone tends to keep the fractured bone in its proper situation ; the application of a piece of wetted pasteboard, and a bandage. Passive motion should be employed early.

If not connected with the Joint.—Should the fracture not extend so high as the joint, the semi-flexed position of the limb over a double inclined plane will be best, as the weight of the leg then counteracts the efforts of the muscles, which would otherwise draw up the inferior portion of the broken bone.

OF DISLOCATION OF THE HEAD OF THE FIBULA.

Causes.—This accident may occur from violence or relaxation of ligament. I have only seen one case from the former cause, which was accompanied with a compound fracture of the tibia, requiring the removal of the limb.

From Relaxation.—The displacement in consequence of relaxation is more frequent ; if the head of the bone slips backwards, it can be easily replaced ; but unless confined in its proper situation, it is directly dislocated again.

Treatment.—The first object in the treatment is to promote the absorption of an effusion of synovia which exists in the joint ; this may be effected by repeated blistering, and afterwards a strap should be employed to buckle around the upper part of the leg, with a small pad attached to it, which should press behind the head of the bone, to retain it firmly in its natural situation.

LECTURE XLV.

ON DISLOCATIONS OF THE ANKLE JOINT.

Strength of the Joint.—THIS articulation, which is formed by the tibia, fibula, and astragalus, with their cartilages, and synovial membrane, is so strongly protected by the form of the joint, and the numerous ligaments connecting these bones, that great violence is necessary to produce a dislocation, and when this does occur, it is generally accompanied with fracture, the ligaments often affording more resistance than the bones.

Three Forms.—The tibia may be dislocated in three different directions, viz., inwards, forwards, and outwards; a displacement backwards is also said sometimes to take place. Cases have likewise occurred in which the foot has been thrown upwards, the astragalus being received between the tibia and fibula, in consequence of the ligament, which unites these bones, giving way; but this is only a severe form of the internal dislocation.

OF SIMPLE DISLOCATION OF THE TIBIA, INWARDS.

Appearances.—This is the most common of the dislocations of the ankle. The malleolus internus forms a projection under the skin, on the inner side of the foot, and the integument is so much distended as to appear in a bursting state;—the foot is turned outwards, so that its inner edge rests upon the ground, when the patient is erect,—a depression exists above the outer ankle, but there is otherwise much swelling; a crepitus can be usually felt about three inches above the external malleolus on moving the foot, which can be done laterally without difficulty, but the motion creates violent pain.

On Dissection.—The appearances upon examining the seat of injury by dissection, are the following:—the end of the tibia rests upon the inner side of the astragalus; instead of on its upper articular surface; and if the accident has occurred from a person jumping from a considerable height, the lower end of the tibia where it is connected to the fibula by ligament, is broken off, and remains attached to the fibula, which is also fractured from two to three inches above the malleolus, and the end of the superior portion of the fibula is carried down upon the upper surface of the astragalus, occupying the natural situation of the tibia; the inferior portion of the fibula with its malleolus remains in its natural position, and the ligaments connecting it to the tarsal bones are uninjured.

Causes.—The most frequent cause of this accident is jumping from a great height, or it is sometimes produced by the foot being caught

whilst a person is in the act of running, with the foot turned out, so that the foot is fixed whilst the body is carried forwards.

Reduction.—The reduction of this dislocation, which should be effected as soon as possible, may be accomplished in the following manner:—place the patient upon a mattress, properly prepared, on the side which corresponds to the injured limb, and bend the leg at right angles with the thigh, so as to relax the gastrocnemii muscles; then fix the thigh, whilst an assistant draws the foot gradually in a line with the leg, and at the same time press the lower extremity of the tibia outwards towards the fibula, to force it upon the articular surface of the astragalus.

Reason of Failure.—Great violence will often fail in reducing this dislocation, if the limb be kept extended: when, in the same case, the replacement may be very readily effected after the leg has been bent in the mode I have described. The difficulty in the former instance is from the powerful resistance of the gastrocnemii muscles.

Treatment.—After the reduction, the limb is still to be kept upon its outer side, being surrounded by a many tailed bandage, and supported upon a well padded splint which has a foot piece; a second splint also furnished with a foot piece is to be placed on the opposite side of the limb, or that which is uppermost; and these splints are to be so secured as to prevent eversion of the foot, and to preserve it at right angles with the leg. The bandage is to be moistened with an evaporating lotion. The subsequent inflammation must be kept within bounds by local or general bleeding as necessary, and the secretions must be attended to.

Period of Cure.—About five or six weeks after the accident, the patient may be allowed to leave his bed, having the joint well supported by the application of straps of plaster around it. After eight weeks, passive motion and friction should be employed to restore the motions of the joint.

OF SIMPLE DISLOCATION OF THE TIBIA, FORWARDS.

Appearances.—This accident produces the following appearances:—the foot seems much shortened, the toes are pointed downwards, and the heel projects. The inferior extremity of the tibia forms a large projection upon the middle and upper part of the tarsus, under the extensor tendons, and a depression exists before the tendon-Achillis.

On Dissection.—When examined by dissection, the tibia is found to rest upon the upper surface of the navicular and internal cuneiform bones, but a small part of its articular surface still is in contact with the articular surface of the astragalus. The fibula is broken, and the superior portion of the bone is carried forwards with the tibia; whilst the malleolus externus, with two or three inches of the lower part of the fibula, remains in its proper situation; the capsular ligament is lacerated extensively on its fore part, and the deltoid ligament is partially torn through.

Causes.—The most frequent causes of this injury are, a fall backwards at the time that the foot is confined, or jumping from a carriage in rapid motion, whilst the toes are pointed forwards.

Reduction.—To accomplish the reduction, the patient should be placed on his back upon a mattress, and the thigh being elevated towards the abdomen, the leg is to be bent at right angles with the thigh; the foot is then to be extended in a line a little before the axis of the leg, the thigh being fixed, and the tibia pressed backwards to its natural position.

Treatment.—When the reduction has been effected, the many tailed bandage, and padded splints are to be applied as in the former case, and the same means adopted to prevent excess of inflammation. The position of the limb should be upon the heel, with the knee bent, and the foot well supported. After five weeks the patient may be allowed to get up, as the fibula will then be united; and passive motion may be carefully used.

OF THE PARTIAL DISLOCATION OF THE TIBIA, FORWARDS.

Nature of.—In this accident, the tibia does but half quit the articular surface of the astragalus, resting in part upon the navicular bone, and in part on the astragalus.

Signs of.—The signs of the injury are, the pointing of the toes, the elevation of the heel, a great difficulty in placing the foot flat upon the ground, and a considerable loss of power in the movements of the joint. The shortness of the foot, or the projection of the heel, are not very remarkable; the fibula is broken.

Case.—The first case of this injury which I saw, was in a very stout lady at Stoke Newington, who supposed that she had sprained her ankle by a fall. The toes were pointed, and the motions of the ankle joint entirely destroyed. I attempted to draw the foot forwards, and to bend the ankle joint, but I could not succeed. Some years after, I saw this lady walking upon crutches, the toes were still pointed, and she could not place the foot flat upon the ground.

Dissection.—I was not, however, perfectly acquainted with the precise nature of the injury she suffered from, until my friend, Mr. Tyrrell, showed me a foot which he had dissected at Guy's Hospital, and which he was so kind as to give me. It presents the following appearances: the articular surface of the lower part of the tibia is divided into two, the anterior part is seated on the navicular bone, the posterior upon the astragalus; these two articular surfaces formed at the lower extremity of the bone have been rendered smooth by friction; the fibula had been fractured.

Reduction.—The mode of reducing this partial displacement should be in every respect similar to that recommended for the complete dislocation, the same directions for the after-treatment should also be adopted. As the signs of the injury are not very well marked, great

attention will be required in the examination, and the surgeon should not rest satisfied until the motions of the joint are in a great measure restored.

OF SIMPLE DISLOCATION OF THE TIBIA, OUTWARDS.

This injury is usually attended with much more surrounding mischief than either of the former, as it is produced by greater violence; there is more laceration of ligaments, and more contusion of the integument.

Appearances.—The sole of the foot is turned inwards, and its outer edge rests upon the ground, when the patient is standing; the foot and toes are pointed somewhat downwards, and the external malleolus forms so decided a prominence upon the outer side, by protruding the skin, that the nature of the accident can scarcely be mistaken.

On Dissection.—Upon dissection, the malleolus internus of the tibia is found obliquely broken from the shaft of the bone; the inferior portion of the shaft of the tibia is thrown forwards and outwards upon the astragalus before the malleolus; the deltoid ligament remains entire. If the fibula is perfect, the three ligaments naturally connecting it to the tarsus are ruptured; but when the fibula is fractured, which often happens, these ligaments are not injured. The astragalus is sometimes broken, and the capsular ligament is lacerated.

The injury may be occasioned either by a fall or jump from a height, the foot being twisted inwards, or by the passage of a carriage wheel over the articulation.

Reduction.—To effect the reduction, place the patient upon his back, elevate the thigh towards the abdomen, and bend the leg at right angles with the thigh; then fix the upper part of the leg and thigh, whilst an assistant extends the foot in a line with the leg, and at the same time press the tibia inwards towards the astragalus.

Treatment.—When reduced, apply the many tailed bandage and padded splints with foot pieces, as in the former cases; but in addition, place a pad over the fibula, just above the outer malleolus, so that when the limb is laid upon the outer side, which is the best position, the portion of bone above the pad may be raised, and the pressure of the outer malleolus upon the injured integument may be prevented.

A similar mode of after-treatment to that described for the other dislocations, will be proper, but more depletion will usually be required after this injury, as the inflammation is generally more violent. Passive motion should be employed after six weeks from the accident.

OF COMPOUND DISLOCATIONS OF THE ANKLE JOINT.

Nature of.—The only difference between these injuries and those already described is, that in these cases the integuments and ligaments are divided, either by the bone, or by the pressure of some uneven and

hard body, on which the limb may have been thrown, so as to expose the joint from which the synovia escapes through the wound.

Consequences.—The consequences of these injuries are, however, very different from those occasioned by the simple dislocations; usually the following effects are produced. The synovia at first escapes through the wound, and in a short time after the accident, inflammation commences; this inflammation extends to the ligaments as well as to the extremities of the bones forming the joint, and the secretion from the joint becomes much increased. In about five or six days, suppuration commences; at first the discharge of matter is small, but it soon becomes very profuse. Under this process of suppuration, the articular cartilages become partially or wholly absorbed, but in general only partially; the ulceration of the cartilage is a very slow process, usually attended with much constitutional suffering, and is often followed by exfoliation of bone. When the cartilages have been removed, granulations arise from the extremities of the bones, and from the ligaments, which inosculate and fill the cavity of the joint. In some cases, adhesive inflammation occurs in the commencement, and the articular surfaces become united without any absorption of the cartilages; this often occurs in part, but I have seen it extend to the whole surfaces.

Anchylosis does not always follow.—But neither the adhesive union, nor the inosculature of the granulations entirely destroy the motions of the joint, if passive motion be employed sufficiently early and carefully; and I have seen, in some cases, the mobility of the articulation restored to nearly its original extent; otherwise, the other joints of the tarsus acquire such an increase of motion, as to render the deficiency in that of the ankle hardly perceptible. When the powers of the joint are completely destroyed, it is by a deposit of cartilage, and a subsequent formation of phosphate of lime, as is usual in the reparation of fracture of bones.

Constitutional Symptoms.—The various local effects which I have described are accompanied usually with much constitutional suffering. About twenty-four hours, or in two or three days after the receipt of the injury, the patient begins to complain of pain in the head and back, showing the influence of the accident upon the brain and spinal marrow. Loss of appetite, nausea, and often vomiting, indicate disorder of the stomach; the tongue is white, yellowish, or brown, according to the degree of irritation; the bowels generally become inactive, from a paucity of the secretions, not only from their mucous surface, but from the glands connected with them, as the liver, pancreas, &c.; the secretion of the kidneys is much diminished, and of a deep colour; the skin becomes hot and dry, ceasing to pour out the perspirable matter. The action of the heart and arteries is accelerated, the pulse becoming hard, and in severe cases it is often irregular or intermittent. The respiration is hurried in sympathy with the quickened circulation. When the irritation is great, the nervous system becomes further affected, the patient is restless and watchful, and as the severity of the case increases, delirium, subultus tendinum, or tetanus occur.

Such are the usual effects of local irritation upon the constitution,^tbut the degree in which they are developed depends upon the irritability of the system, the powers of reparation, and the extent and violence of the injury.

Cause of Symptoms.—The cause of the severity of the local and constitutional symptoms in these cases appears to be the exposure of the joint, and the great efforts necessary for the reparation of the injury under such circumstances, as the simple dislocations very rarely occasion these distressing effects, but the adhesive process repairs the mischief, without giving rise to either much local or constitutional disturbance. Thus the first principle in the treatment of the compound dislocation is clearly pointed out, viz. : the closure of the wound, and the aiding, by all means in our power, its union, by adhesive inflammation ; so as to prevent suppuration in the cavity of the joint.

Amputation formerly performed.—Formerly, and within my recollection, it was thought expedient for the preservation of life, by many of our best surgeons, to amputate the limb in these cases ; but from our experience of late years, such advice would in a great majority of instances be now deemed highly injudicious.

The mode of treatment to be adopted in these cases is as follows, and will apply generally to either form of dislocation.

Treatment.—The first object will be to suppress hæmorrhage, if any of consequence exists. Of the two arteries, the anterior and posterior tibial, which are likely to be wounded, the former will be found most frequently injured, the latter generally escaping ; but in case of bleeding from either, it will be necessary to apply two ligatures, one above and another below the aperture from which the bleeding occurs. The projecting extremities of the bones are often covered with dirt, having been thrust against the ground ; when the next step will be to cleanse them thoroughly from every particle of extraneous matter, otherwise it will afterwards excite suppurative inflammation in the joint. Should the bone be comminuted or shattered, all the detached portions must be carefully removed, and if the wound is not sufficiently large to allow of their being taken out without much difficulty, it should be enlarged with a scalpel, but the incision should be made in such a direction, as will avoid further exposure of the joint. The wound will sometimes require dilatation, if the integuments are nipped into the joint by the projecting bone, as they cannot be in many instances liberated without.

The reduction of the dislocation is to be accomplished by the same means as already described in the simple displacements, and when reduced, the edges of the wound are to be very carefully approximated by sutures and strips of plaster, over which a piece of lint, dipped in the patient's blood, is to be placed ; this, when the blood coagulates, forms, as far as I have seen, the best covering for the wound. The part is to be further supported by the application of separate pieces of linen, in the same way as the many tailed bandage, but each portion being unconnected with the others, so that any one piece can be removed, and another substituted for it, by tacking the ends of the old

and new strips together, before the former is drawn from its situation ; in this way the limb is not disturbed by the change. This bandage is to be moistened by an evaporating lotion. The padded splints are lastly to be employed with foot pieces, as recommended in the simple dislocation, but a portion of that one situated on the wounded side of the limb should be cut out, in order to enable the surgeon to dress the wound without removing the splint. The position in which the extremity should be placed is the same as in the simple injury, but must be occasionally varied a little according to the seat and extent of the wound.

Constitutional Remedies.—The next object will be to prevent or diminish the constitutional suffering likely to ensue ; in some cases it will be necessary to take away blood generally, but this should be done with the utmost caution, as great power is required to support the after process of restoration, which will fail altogether if the patient be rendered feeble by the loss of blood or other means. Purgatives should also be administered with great care, as the frequent change of position which the action on the bowels necessarily occasions, tends very much to interrupt or destroy the adhesive process, which it is our chief object to promote. I am confident that I have seen many cases of compound fracture prove destructive under such circumstances. The bowels should be emptied as soon as possible after the accident, before the adhesive inflammation is set up, after which a mild aperient may be given at intervals.

After-treatment.—Should the patient remain free from pain, this mode of treatment should be persevered in until the adhesive process is complete ; but should he complain of suffering in the injured joint, the dressings must be cautiously raised, so as to expose a very small part of the wound, to allow of the escape of any matter which may have formed, but not to disturb any adhesions which have taken place. If the suppurative inflammation has commenced, the first dressings may be removed, and the surface of the wound be merely covered with some simple dressing. Should much surrounding inflammation arise, it will be necessary to apply poultices on the wound, and leeches upon the limb, at a little distance from it, and afterwards to continue the use of the evaporating lotion over the inflamed surface not covered by the poultice. When the inflammation has subsided, the use of the poultices should be discontinued, as they relax the vessels too much, and retard the progress of cure.

Period of Recovery.—In favourable cases, the wound heals in a few weeks with but little suppuration. In those less favourable, the discharge is very copious, and portions of the extremities of the bones exfoliate, rendering the recovery very tedious. Even in the most favourable instances, the patient cannot venture to use crutches before the expiration of three months, and often not until a much more distant period.

I shall now relate a few cases, which will further explain the best

mode of treatment, and also show the impropriety of recommending amputation indiscriminately in these cases.

Cases.—In the year 1797, I attended a gentleman with Mr. Battley, who then practised as a surgeon. This gentleman had, in a fit of insanity, jumped from a two pair of stairs window into the street, by which he caused a compound fracture of the ankle joint; he, nevertheless, got up without assistance, and having obtained admission into the house, he ascended the stairs to his bed-room, and having fastened the door, got into bed. The door was forced open, as he would not unfasten it. When I examined the injured limb, I found that the tibia was dislocated inwards, and that the astragalus was broken into many pieces, many of which being detached, I removed. We then reduced the displaced bone, and having approximated the edges of the wound, covered the whole with lint wetted with the patient's blood. The limb was placed on the outer side, with the knee flexed, and an evaporating lotion was freely applied. In three or four days after, considerable inflammation took place, but this was subdued by general and local bleeding, with emollient applications to the wound; extensive suppuration followed, and continued very profuse for nearly two months, when the surface was covered by granulations; at the same time an improvement took place in his mental affection, which became less and less as the wound closed; between four and five months from the accident, the healing process was complete, and the state of his mind natural. At the expiration of nine months he returned to his employment, but could not walk without the aid of a stick for many months.

In October, 1817, I was called by Mr. Clarke, a surgeon, residing in Great Turnstile, Lincoln's Inn Fields, to visit Mr. Caruthers, a young gentleman who had a compound dislocation of the ankle joint inwards, occasioned by the overturning of a stage coach at Kilburn, from which place he had been removed to Lambeth where he resided. The extremity of the tibia projected to the extent of between two and three inches from a wound through the integuments on the inner side. The tibia was broken, a small portion of it remaining attached to the joint by the ligaments; the fibula was also fractured badly. I found it necessary to enlarge the aperture in the integuments, before I could replace the dislocated bone. After the reduction, simple dressings were spread over the wound; these were confined by a many tailed bandage, moistened with an evaporating lotion, and the limb was supported by the padded splints, and placed in a semi-flexed position upon a quilted pillow. The patient was bled, and took mild purgatives, with saline medicines. Considerable local and constitutional suffering followed, which greatly exhausted the patient; abscesses formed in the leg, and some exfoliation took place, much retarding the progress of cicatrization. These abscesses were freely opened, and the parts supported by strips of plaster; the limb was kept cool by the use of evaporating lotion, and the strength was supported by giving bark and wine. In January 1819, the last exfoliation occurred, after which the wound healed rapidly, and the patient recovered his health. Mr.

Caruthers has since obtained very considerable use of the limb, being able, he told me, to walk six or eight miles if necessary.

Mr. Abbott, of Needham Market, Suffolk, sent the particulars of the following interesting case, which occurred under his care.

Mr. Robert Cutting, aged seventy, corpulent, intemperate, and of a gouty habit, had his ankle dislocated in consequence of being thrown down in a quarrel: the end of the tibia was forced through the integuments, and protruded about four inches; the fibula was fractured a few inches above the joint, and the foot was turned outwards. Immediately he got up, and in struggling to stand, he covered the end of the bone with dirt and sand, of which also a considerable quantity got into the joint. He was conveyed home about four miles in a cart, and Mr. Abbott saw him about five hours after the accident, and recommended amputation in consequence of the extent of injury, and the disordered state of the patient's constitution; but this the patient could not be induced to submit to, therefore the injured parts were carefully and thoroughly cleansed with warm water, the dislocation was reduced, and the edges of the wound were nearly brought into apposition by strips of linen dipped in the *tinctura Benzoini composita*, without sutures or adhesive plaster; a thin board, hollowed to receive the leg, and with an opening in the situation of the outer ankle, being well padded, was placed under the outer side of the limb, which was enveloped in a folded flannel bandage, from the foot to the knee; the leg was laid in a flexed position, with the foot a little raised. The patient was bled to $\bar{\text{z}}$ xij, and ordered an mild saline purgative every two hours, until the bowels were relieved, with milk broth for his food.

The accident happened on the 25th of April, 1802; and he proceeded very favourably until the 27th, when he complained of darting pains in the injured limb, and he was restless, yet his skin and bowels were acting properly. Upon unfolding the flannel, some swelling appeared about the joint, and some gleety discharge escaped from beneath the dressing; the inflammation did not appear much more than necessary, but six leeches were applied at a little distance from the seat of inflammation, which relieved the pain, and the wound was dressed as before. This plan of treatment was continued, and the case proceeded most favourably; on the 2d of May, a small quantity of matter was discharged, but without augmenting the symptoms. After ten weeks, he was moved daily from the bed to a sofa, and about this time the whole of the dressings were taken off for the first time, when the wound was found to be completely cicatrized; previously, only small portions had been elevated at a time, and fresh pieces put on to keep the covering perfect. When exposed, the exterior of the joint presented its usual appearance, excepting a slight enlargement in the situation of the cicatrix; but this was not more than could be expected. At the end of five months, he was allowed to go on crutches, and bear as much weight on the limb as his own feelings suggested to be proper. Being a butcher by business, he afterwards rubbed the limb with the fluid obtained from the joints of animals, and also frequently placed his foot

and ankle in the warm paunch of an ox. Before the expiration of twelve months, he could walk without the assistance of a stick, and for many years before his death could walk with perfect ease and freedom. He lived to the age of eighty-three.

The following are the particulars of a case sent to me by Mr. Scarr, Surgeon, at Bishop's Stortford; he also sent the patient for my inspection, after his recovery, so that I had an opportunity of witnessing the happy result of Mr. Scarr's skill.

Case.—John Plumb, aged 38, had descended on a ladder, about ten feet from the ground, with a sack of oats upon his shoulders, when the ladder slipped from under him, and he fell to the ground upon his feet, still retaining the load of oats. Mr. Scarr was passing at the time, and immediately attended to the man. When his stocking had been removed, the tibia and fibula were found projecting through the skin at the outer side of the ankle, and the astragalus was exposed through an opening on the inner side; both the wounds were clean, and without much surrounding mischief. Mr. Scarr therefore immediately reduced the displacement, and closed the wounds by the application of adhesive straps, and placed the patient in bed, with the limb flexed, and laid upon the outer side. The limb was moistened with a lotion of acetate of lead. About $\frac{3}{4}$ xvj of blood were taken from the arms; some saline medicines administered; and the antiphlogistic treatment persevered in, with due regard to his constitutional powers; some abscesses formed, which were opened in the most favourable points, and the patient became gradually convalescent in about six months, without any very urgent symptoms. At the end of twelve months, he was able to resume his laborious occupation as before the accident.

Removing a Portion of Bone.—It has been recommended in the treatment of these cases, to remove with a saw the projecting extremity of the tibia, before the reduction of the dislocation is attempted; there are some instances in which such a proceeding is absolutely necessary, and many reasons are given for adopting this practice in general.

When necessary.—The cases in which it must be necessarily adopted are the following:

First, when the dislocation cannot be otherwise reduced without great violence.

Secondly, when the extremity of the bone is fractured obliquely, so that if reduced it immediately slips from its proper situation, when the extension is discontinued; but after the removal of the point by the saw, it rests readily upon the astragalus.

Reasons for, generally.—The reasons assigned for adopting this plan in all instances are,

First, That the shortening of the bone relaxes the muscles, and diminishes the tendency to spasmodic contractions, which so frequently occur when much force has been used to replace the bones.

Secondly, That the adhesive process goes on much more readily from the sawn extremity of the bone than from the natural articular surface, consequently the local irritation is less.

Thirdly, That when the suppurative inflammation does occur, it is rendered much less, as there is not the same extent, by nearly one half, of cartilaginous surface to be removed by ulceration, and thus by the diminution of the ulcerative and suppurative process, the constitutional irritation is much lessened.

Fourthly, It has been remarked, that those cases have usually recovered quickly, in which the extremities of the bones have been broken into many small pieces, and separated so as to render their removal necessary.

Fifthly, I do not recollect any instance of unfavourable termination, when this practice had been pursued ; but I have known many unsuccessful in which it had not been adopted.

Objections to.—The objections made to this treatment are, first, that the limb must be shortened by the removal of the portion of bone, and, secondly, that the joint must afterwards become ankylosed.

Not important.—Provided we admit that the danger of the case is lessened, which I believe, by the sawing off the extremity of the tibia, the first objection cannot be considered of much weight, more especially as the defect is so easily remedied afterwards, by increasing the thickness of the sole of the boot or shoe. With regard to the second objection, I do not imagine that ankylosis is at all a necessary consequence, having seen cases in which considerable motion remained after the removal of bone, and recovery of the patient. I know that ankylosis is liable to take place in either mode of treatment, but even then the patient, after a time, walks with very little halt, as the other tarsal joints acquire so much increase of motion.

Treatment adapted to the Case.—It appears to me, however, that either plan may be adopted, according to the features of the case, and I should not wish it to be supposed that I recommend the one to the entire exclusion of the other.

General Principles.—When the dislocation can be reduced without much force, and the bones retain their proper situation readily, without the occurrence of spasmodic muscular action ; and if the patient be not very irritable, an attempt should certainly be made to effect a cure, without removing the ends of the bones ; but if the bones be shattered, or fractured obliquely, so that it will not retain its proper position when reduced, the saw should be employed, in the first instance, to smooth the ends of the bones, when the small separate pieces have been taken away, and in the second place, to make a surface to rest upon the astragalus. I would also rather use the saw, than employ great violence to reduce the dislocation otherwise ; likewise in those cases where the spasmodic contraction of the muscles renders it extremely difficult to keep the injured joint in its natural position.

I shall now relate some cases, which will afford an opportunity of judging better of the propriety of what I have stated.

Cases.—Nathaniel Taylor, aged thirteen, was admitted into Guy's Hospital, in consequence of his having a compound fracture of his

ankle joint. The injury had been occasioned by a boat falling upon his leg. The end of the tibia and the fractured extremity of the fibula projected through an extensive opening at the outer ankle; the malleolus externus retained its natural situation and ligamentous connexions. The foot was turned inwards, and hung so loosely, that the sole could be placed against the side of the leg. I tried to reduce the bones to their proper situations, but could not effect it, but by very great force, and as soon as the extension was discontinued, they again slipped from their places. Under these circumstances, those around me urged me to amputate the limb; but considering my young patient to be otherwise in good health, and not of an irritable habit, I determined to preserve the limb if possible. On a further examination, I discovered that the malleolus externus and inferior part of the fibula connected to it, although in its natural position, was very loose, and I therefore removed it, by dividing the ligaments with a scalpel, and I afterwards sawed off about half an inch of the end of the tibia. I then found that I could easily replace the bones, and that they retained their positions without difficulty. Having approximated the edges of the wound, I covered it with lint dipped in the patient's blood, and by strips of adhesive plaster; the limb was placed upon the heel, and supported by padded splints. Scarcely any constitutional suffering occurred, but little suppuration took place, and the wound gradually healed. One abscess formed over the tibia, but did not give rise to any severe symptoms. He was allowed to get up, and to use his crutches after about two months, and at the expiration of four months he could walk very well. There appeared to be some motion at the ankle, but the tarsal joints had evidently acquired much increase of motion.

In December, 1818, I was called upon to attend, with Mr. Jones, of Mount Street, a Mr. West, aged forty, who had severely injured his left ankle, by jumping from a one horse chair, alarmed at the horse's kicking.

When I first saw him, the extremity of the tibia projected through a wound in the integuments, at the inner side of the ankle, and a portion of skin was nipped into the joint by the bone, the foot was turned outwards, but hung loosely. Finding that our patient was of a most irritable constitution, and seeing that great violence must be employed to reduce the bone, and to effect the reduction it would be necessary to enlarge the wound considerably, I considered it much better to remove the extremity of the tibia, in order to avoid those evils. I therefore sawed off a portion of the bone, and then effected the reduction without difficulty, nor was there any disposition to further displacement from muscular contraction. The edges of the wound were next secured in contact, by the insertion of a fine suture, and the part was covered with lint wetted with blood, and a many tailed bandage. The limb was secured by the padded splints, and placed upon the outer side, in a semi-flexed position. The patient was bled to the extent of $\frac{3}{4}$ x, some opium was given him, and the spirit lotion was freely applied to the extremity. On the third day, the foot exhibited slight vesications, and he com-

plained of tension, and some pain, but this soon subsided. About the sixth day, the wound began to discharge a serous fluid, mixed with red particles; poultices were employed; the secretion soon became purulent, and continued to increase until the end of a month, when it gradually subsided. At the end of two months, the patient was allowed to get on to his sofa, as the joint appeared firm; a small wound still, however, existed, from which it was evident some small exfoliation would take place; this did not happen for several months. During the progress of the case, Dr. Pemberton was consulted in consequence of the patient's having an extremely disordered state of stomach: but, notwithstanding, the symptoms produced by the accident were not more severe than those usually occurring in a common case of compound fracture.

Dr. Rumsey, of Amersham, was so kind as to send me the account of an excellent case of compound dislocation of the ankle, complicated with simple fracture of the thigh bone of the same limb; the following are the particulars:

Mr. Tolson, aged forty, was thrown from a curriele, on the 21st of June 1792, and in falling, dislocated his left ankle joint. Dr. Rumsey saw him about two hours after the accident, when he found a large wound at the outer ankle, through which the extremities of the tibia and fibula, with a portion of the astragalus, protruded; for the astragalus had been fractured, and one portion of the bone still remained attached to the tibia and fibula, the foot was turned inwards and upwards, and the skin of the outer side, beneath the wound, was very much confined by the dislocated bones. Dr. Rumsey, deeming further advice necessary, sent for Mr. Pearson, of London, and Mr. Henry Rumsey, his brother, a surgeon at Chesham; and during the absence of the messengers, the patient directed Dr. Rumsey's attention to his thigh, which was then ascertained to be fractured at the superior part. This circumstance being considered by Dr. Rumsey and his brother as a decided obstacle to amputation, they determined on endeavouring to preserve the limb. Finding that they could not replace the bones without excessive force, Dr. Rumsey determined upon removing that part of the astragalus which was attached to the dislocated bones. Upon separating this portion of bone, it was found to be as near as possible the superior half, the fracture having been horizontal through its centre. After this had been taken away, Dr. Rumsey still found it necessary to divide a portion of the integuments, which had been confined by the dislocated bones, before he could readily effect the reduction. The bones being replaced, some lint dipped in tincture of opium was laid over the wound; the whole was covered with a poultice made of oatmeal and stale beer, and the leg was secured with padded splints. On Mr. Pearson's arrival, he perfectly approved of the course which had been adopted.

In the night following, the patient became delirious, vomited, and his pulse was full and frequent; he was bled to $\frac{3}{4}$ x, and ordered to take a common saline draught with antimonial wine and tincture of opium every four hours; the tartrate of potash and manna were given in sufficient quantity to relieve the bowels. He also experienced considerable

pain in the ankle and thigh. On the 24th, these unpleasant symptoms had in a great measure subsided, and a discharge commenced from the wound ; he continued the same plan of treatment, with the omission of the antimony, as his stomach was irritable. He continued doing well until the 28th, when the discharge became thin, and he was much troubled with pain and flatulence in the bowels ; it was therefore considered necessary to alter his diet, and on the 29th, he was allowed a small quantity of animal food, some table beer, and port wine ; the bark was also freely taken in substance and in decoction ; he was much benefited by this change. The discharge soon became very copious, in consequence of which the wound was obliged to be cleansed frequently ; the limb was therefore placed upon the heel, as the dressing could not be effectually accomplished without considerable disturbance, whilst it continued on the outer side. After the alteration of position, much more attention was required to prevent further displacement, as the foot had a tendency to incline inwards, causing the end of the fibula to project at the wound ; this was however obviated, by placing some small wedges between the foot and the fracture box, on the inner side, and others between the calf of the leg and the box on the outer side. About the 30th, the use of the poultice was discontinued, and the wound was dressed with dry lint, over which a pledget, spread with the cerat: plumbi superacetatis, was placed, and confined by a bandage to keep up moderate pressure. The bark and opium were continued until the beginning of August, and the wound gradually healed with only one check from the confinement of matter, the cicatrization being completed about the middle of September. The union of the thigh bone also went on well, but as the state of the leg prevented the possibility of keeping up sufficient extension, a degree of curvature was produced by the junction. The patient was soon able to walk about with the aid of a stick only, and acquired a power of motion in the injured joint nearly equal to that of the sound limb.

Another excellent case occurred, under the care of Mr. Cooper, of Brentford, formerly my dresser, who obliged me by sending the particulars from which the following account is taken.

Thomas Smith, aged thirty-six, a painter, dislocated his ankle outwards, by a fall with a ladder, his foot being caught between two of the steps. Mr. Cooper was fortunately passing at the time, and immediately attended to the patient. On examining the limb, he found that the fibula was broken about five inches above the outer malleolus, and the tibia fractured longitudinally three inches from the joint ; the small inferior portion remained attached with the inner malleolus. About an inch and a half of the inferior part of the shaft of the tibia, and the broken end of the fibula projected through a wound in the skin, rather anterior to the malleolus externus. Mr. Cooper finding that moderate force was not sufficient to replace the bones, he divided a portion of integument, which was pressed in by the protruding bones, and he also removed, with a metacarpal saw, an inch of the tibia, and a small piece of the fibula, after which the reduction was easily accom-

plished. The edges of the wound were brought together by two sutures, and further secured by strips of adhesive plaster; over this the many-tailed bandage, and the padded splints were placed to support the limb, which was placed on the heel, and kept cool by an evaporating lotion. In the evening, an opiate was given, and he was ordered some aperient for the morning. Some slight bleeding occurred during the following night, but not sufficient to require a removal of the dressings, which were not, therefore, disturbed until the fourth day, when they were taken off, and the appearance of the wound was then favourable. On the eighth day, a slough had formed, about five or six inches in circumference; a poultice was therefore applied to the foot, and the evaporating lotion continued to the limb above; he also took port wine and bark, to support him under the profuse suppuration which followed. The slough separated on the thirteenth day, exposing a healthy granulatory surface, after which merely simple dressing was applied. In five weeks from the accident, the wound was perfectly healed; and in a little more than two months, the fractured bones had become so firmly united, that the patient was able to sit up. In three months he began the use of crutches, and eventually obtained almost a perfect limb.

This man had suffered frequently from *colica pictonum*, and had an extremely irritable stomach, he was also naturally of a nervous temperament, therefore but ill calculated to support the consequences of so severe an injury. He derived considerable benefit from the occasional use of the saline effervescent mixture, and from the free exhibition of opium at night.*

* Although it is perfectly unnecessary to state more cases in confirmation of the correctness of Sir Astley's opinions respecting the treatment of these injuries; yet I think the following account of sufficient interest to warrant its relation:—

Timothy Holland, a very stout muscular man, aged about thirty-five years, employed as a labourer at the London Docks, was standing on the quay, close to one of the swing bridges, when the bridge was forcibly and unexpectedly swung round, and struck his right leg on the outer side, a little above the ankle, occasioning a severe compound dislocation inwards, for which he was brought to St. Thomas's Hospital, soon after the accident, on the 23d of August, 1826.

I was immediately sent for, and on my arrival at the Hospital, found the patient placed upon a bed, with the injured limb in the following state:—About two inches of the inferior extremity of the tibia projected through an extensive wound on the inner side of the joint; the internal malleolus was broken off, and remained loosely attached by the deltoid ligament. The wound extended in two directions, one reaching from about three inches above the joint, a little to the outer side of the course of the anterior tibial artery, to the centre of the metatarsal bone of the great toe; the artery was completely exposed for more than three inches, but had not been wounded; the second portion of the wound extended from the former, immediately over the articulation, round the anterior and inner parts of the joint, as far as the back of the tendo-Achillis; the posterior tibial artery and nerve were also exposed to the extent of an inch, but otherwise uninjured. A portion of the integument, about four inches in circumference, near the inner side of the joint, appeared to have suffered considerably, but retained its sensibility. The fibula was fractured about three inches above its malleolus.—Notwithstanding the formidable appearance of the case, I found my patient cool, and willing to submit to any thing I proposed. His composure and time of life, when the constitutional powers are great, determined me to attempt the preservation of the limb. On endeavouring to replace the bones,

These cases I think quite sufficient to show, that in very many instances, not only the life of the patient may be preserved without the removal of the injured limb, but that the extremity is, afterwards, infinitely more useful than any artificial one could be, and that it may become nearly as perfect as previous to the accident.

Amputation sometimes Necessary.—There are some circumstances, however, which render the operation of amputation absolutely necessary, and these I shall now briefly point out.

In Old Persons.—First, the advanced age of the patient, when the powers of the constitution are not sufficient to support the extensive suppurative inflammation likely to follow the injury, but which the operation of amputation does not expose the patient to.

For every Extensive Wound.—Secondly, a very extensive lacerated wound, with much hæmorrhage, will render it imprudent to attempt to preserve the limb.

For Extensive Fracture.—Thirdly, Extensive comminution of the tibia or of the tarsal bones, as the astragalus and calcis, will give rise to a necessity for amputation. When only some small portions of bone

I found it could be effected without much violence, but that they became again dislocated immediately after the extension was discontinued, I therefore removed, with a saw, nearly an inch of the end of the tibia, and likewise took away the malleolus internus, which was but slightly connected by ligament. The reduction was then easily accomplished, and the disposition to further displacement no longer existed, excepting that the end of the tibia advanced a little forwards. This I easily remedied, by placing a long narrow splint on the posterior part of the limb, from the upper projecting part of the calf of the leg to the heel, and then fastening a broad piece of tape around the splint and leg, a little above the seat of injury, so as to press the heel forwards, and the end of the tibia backwards. The edges of the wound were brought together and secured by suture and strips of soap plaster, over which, the many tailed bandage and splints were applied; the limb was placed upon the outer side, in a semi-flexed position; the bandages were kept wet with a splint lotion; the patient passed a sleepless night, but was free from pain, his tongue was slightly furred, and his pulse quickened. These symptoms became alleviated by the action of some aperient medicine, and he proceeded very favourably until the 30th, when he complained of considerable pain in the ankle, and exhibited a good deal of constitutional derangement. The dressings being removed, that portion of the skin which had been so much injured at the time of the accident was found to be sloughing; otherwise the appearance of the wound was favourable. Some fresh strips of plaster were lightly applied, and covered by a poultice, and he was ordered some saline effervescent medicine. On the 5th of September, the suppuration had become profuse; the poultice was discontinued, and the wound was dressed with the nitric acid lotion over the slough, and simple cerate to cover the whole; the same position was observed, and he was allowed some meat and porter for the first time. From this period, only a slight check occurred in the cure, by the burrowing of some matter up the leg, which was relieved, by altering the position a little, and applying a small compress in the direction of the sinus. The wound was completely closed by the end of October; he was then allowed to sit up, but did not venture to bear at all upon the limb until some weeks after. He was discharged from the Hospital on the 28th February, 1827, having regained a perfect use of his limb, wearing a shoe with the sole thick, in proportion to the shortening of the leg, with which he walked quite free from any lameness. I repeatedly examined the joint which had been injured, and could discover but a very trifling difference between its motions and that of the sound ankle.—T.

are broken off, they should be carefully removed, and the end of the bone be smoothed by a saw.

Fourthly, The dislocation of the tibia outwards, as it is generally accompanied with extensive injury to the soft parts, as well as to the bones, will often require the performance of amputation.

Wound of a Large Artery.—Fifthly, the division of a large artery with an extensive wound, might render the operation necessary ; but I should not, in all cases, recommend amputation on this account, more especially if the injured vessel was the anterior tibia, as I have known more than one instance of recovery, in which this vessel has been secured, and the limb saved. Division of the posterior tibial artery could hardly take place without injury to the large accompanying nerve, which would increase the necessity for removing the limb.

Extensive Contusion.—Sixthly : extensive contusion of the surrounding soft parts, likely to occasion the formation of large sloughs, would be a reason for amputating ; this will generally happen when the injury has been occasioned by the passage of the wheels of a heavy laden wagon over the joint ; or from the falling of a very heavy weight upon the limb.

These are the principal circumstances which render an immediate performance of amputation necessary ; but there are others which may make it equally proper at a more distant period from the accident.

Mortification.—If mortification ensues, the operation will be required ; it is, however, best in such a case, to wait until the extent of the mortification is clearly defined, before the amputation be performed, although I conceive, that when the mortification results from the division of a blood-vessel, or from other local injury in a healthy constitution, a different practice may be adopted to that which would be proper if the disease arose from constitutional causes. I have known the arm amputated in consequence of mortification produced by a division of the brachial artery at the elbow ; the mortification was extending at the time, but the patient did well, the limb being removed above the elbow. In another instance, where death of the foot had occurred in a case of popliteal aneurism, the limb was amputated above the swelling, whilst the mortification was still proceeding up the leg, and the man recovered.

Excessive Suppuration.—Should the suppuration from the joint be greater than the constitution can support, as I have seen it, amputation will be required to save the life of the patient.

Large Exfoliation.—Again, when considerable portions of bone are exfoliating, and keeping up a continued state of irritation, if they cannot be removed without inflicting great injury, the operation of amputation should be performed.

Deformity of Limb.—Excessive deformity may result from negligence on the part of the surgeon, during the union of the wound, so as to make the limb worse than useless to the patient, when it will be necessary to remove it.

Case.—Mr. Norman, of Bath, amputated the leg of a man in conse-

quence of such deformity. The patient had suffered from a compound dislocation of his ankle inwards, accompanied with displacement of the astragalus, which was removed. After the union of the wound, it was discovered that the os calcis had been drawn up against the posterior part of the tibia, and had there become firmly united to it, the toes being pointed downwards, rendering the limb useless.

When Tetanus occurs.—It has been recommended to amputate when tetanus occurs after this injury, but as far as my own experience goes, I believe that the operation only hastens a fatal termination. I have only seen one case of tetanus following compound dislocation of the ankle joint, which, in spite of every attention on the part of Dr. Ralph, who attended the patient with me, destroyed life.

Not advisable.—Although I have not witnessed the performance of the operation after the appearance of tetanic symptoms, when the injury has occurred in the ankle, yet I have known it tried in several instances, when this formidable affection has been produced from other injuries, and it appeared rather to hasten the progress of the disease than to relieve it.

Cases.—In a case of compound fracture just above the ankle joint, producing tetanus, the limb was amputated; the tetanic symptoms increased, and speedily destroyed the patient.

In another instance, when tetanus had followed injury to the finger, amputation was performed, but without alleviating the symptoms, and the man died. I could relate other cases, all showing how unavailing the operation is under these circumstances.

Chronic Tetanus.—I have known a form of tetanus succeeding injuries, in which the symptoms have never been very severe, and which has been termed chronic tetanus; this is sometimes gradually recovered from, although but little be done by medicine, and nothing at all by surgery. The medicine which I have seen most advantage from, has been calomel and opium; and opium should be applied to the wound.

Excessive Irritability.—There are some persons who are naturally so excessively irritable, that the slightest injuries produce fatal consequences; and in others, again, possessing originally good constitutions, this extremely irritable state may be induced by excess of mental exertion, by intemperance, by great indolence, or other causes, so that very trifling accidents will destroy them. Those persons, also, who are much loaded with fat, and especially those who, under such circumstances, are extremely indolent, generally bear important accidents or operations very ill, and frequently perish in spite of the most cautious and attentive treatment.

OF FRACTURES OF THE TIBIA AND FIBULA NEAR THE ANKLE JOINT.

Of Fibula.—Fracture of the fibula frequently occurs about three inches above the outer malleolus.

Symptoms of.—The patient immediately experiences pain at the seat of the injury, which is much increased by any attempt to bear the weight of the body upon the limb; and in endeavouring to stand, he does not place his foot flat upon the ground, but rests it upon the inner side, to receive the weight chiefly on the tibia; the flexion or extension of the foot also augments his suffering. An inequality of the surface of the limb over the seat of fracture often exists, and a crepitus is readily distinguished, by placing one hand over the injured part, and by rotating the foot at the same time with the other hand.

Causes of.—This fracture is produced by a blow upon the inner side of the foot, which forces it outwards against the lower part of the fibula: also, by a sudden and violent twist of the foot inwards. It is, perhaps, most frequently occasioned by a lateral fall, when the foot is confined. I broke my right fibula by falling on my right side, whilst my foot was confined between two pieces of ice: I felt a snap in the bone at the time of the accident, and experienced pain from every jolt of the carriage in which I was conveyed home.

Treatment.—The treatment necessary for this injury, consists in applying the many tailed bandage, and to keep it wet for a few days with the spirit lotion; over this bandage, the padded splints with foot pieces are to be placed and secured, so as to support the great toe in a line with the patella. The limb should be laid upon a pillow on its side in a semi-flexed position.

Consequences of Neglect.—Although no great deformity can arise from this accident, on account of the support afforded by the tibia, yet a considerable degree of lameness may result, if the case be neglected. Dr. Blair, a naval physician, who had fractured his fibula, and had not paid proper attention to the case, became in consequence unable to walk on flat ground without a lameness; as the foot was twisted by the irregular union of the broken bone.

Of Tibia.—Fracture of the tibia often occurs at its inferior part, either extending into the joint, or seated immediately above it. If the fracture enters the joint, but little deformity is produced; but if above the articulation, the lower part of the upper portion of the bone usually projects a little. The foot is generally inclined somewhat outwards, but the injury is easily detected by the crepitus, which can be felt when the foot is freely moved.

Treatment.—This injury should be treated in every respect as the former, but great care must be taken to prevent the inclination of the foot outwards, and to keep the great toe in a line with the patella. When the fracture takes place obliquely from within to without into the joint, the foot will be turned slightly inwards, and the malleolus externus will project more than usual; it will be necessary, therefore, in the treatment, to attend to this point, otherwise it will be the same. By placing the limb upon the heel, the proper position of it is more readily observed, but the case will do equally well, with attention, if the extremity be laid upon the outer side.

Compound Fracture.—The observations respecting the compound

dislocations of the ankle joint, will be found generally applicable to the cases of compound fracture communicating with the articulation.

OF DISLOCATIONS OF THE TARSAI BONES.

Of Astragalus.—From the situation of the astragalus, and its very firm ligamentous connexion to the tibia, fibula, calcis, and navicular bone, we could scarcely suppose its displacement possible, and although it is occasionally dislocated, yet the injury very rarely if ever occurs without a fracture of one or more of the surrounding bones.

Reduction difficult.—When dislocated, it is extremely difficult to reduce, and if this be not effected, lameness to a considerable extent, must be the consequence.

I had an opportunity of seeing a patient who was under the care of Mr. James, of Croydon, in consequence of an inquiry to the tarsal joint.

Cases.—I found that the tibia was fractured obliquely at the inner malleolus, and that the astragalus was dislocated outwards. Every means which Mr. James could suggest had been tried to replace the bone, but it still continued to project upon the upper and outer part of the foot; so much force had been employed in making extension, that the integument sloughed in part. Considerable deformity resulted; the toes were pointed inwards and downwards and the motions of the joint were in a great measure destroyed.

I attended the following interesting case, with Mr. West of Hammersmith, and Mr. Ireland, of Hart Street, Bloomsbury.

Mr. Downes fell from his horse on the 24th of July, 1820, and dislocated his astragalus. Mr. West, who first saw him, endeavoured to replace the bone, but could not succeed; he therefore placed the limb in splints, and kept the part moistened with goulard lotion. The patient was bled largely, and took some anodyne medicine. On the 25th, I visited Mr. Downes, with Mr. Ireland and Mr. West, when I found the astragalus displaced forwards and inwards, accompanied with a fracture of the fibula a little above its malleolus. All my attempts to reduce it proved ineffectual. The skin over it appeared in a bursting state, so much so that I felt inclined to divide it and remove the astragalus; but knowing the resources of nature in accommodating parts under injuries, and of restoring the usefulness of the limb, I declined interfering, and the previous treatment was therefore continued. On the 28th, the skin over the bone began to inflame, and notwithstanding the employment of leeches and evaporating lotions, it sloughed on the 16th of August, exposing the astragalus, which gradually became loosened and dislodged. A profuse discharge attended this process, but bark and wine freely given kept up the constitutional powers; the wound was poulticed. On October the 5th, I removed the astragalus, having only to divide some few ligamentous fibres. After this, the wound was dressed with

soap plaster, and the patient gradually recovered, being able to walk without the aid of a stick.

Compound Dislocation.—In compound dislocation of the astragalus the plan of treatment to be pursued has been already pointed out in the history of the compound dislocations of the ankle joint, from which it is evident, that the whole or a part of the astragalus may be removed and yet the patient recover a very useful limb. If, however, the astragalus should still remain firmly attached, and can be replaced; such treatment should be adopted in preference to taking it away.

Case.—Mr. Henry Cline had the following case under his care in St. Thomas's Hospital.

On the 21st of June, 1815, Martin Bently, aged 30, was admitted into the Hospital, having been severely injured by the falling of some heavy stones upon his legs. An extensive compound fracture of the tibia and fibula existed in the left leg, near the middle, attended with so much mischief to the surrounding soft parts, that Mr. Cline amputated the limb below the knee. On the right side, a dislocation of the astragalus had been produced, occasioning the following appearances:—the os calcis, instead of projecting at its usual place, formed a protuberance on the outer side of the foot, beyond the external malleolus; and beneath the malleolus was a considerable hollow; on the inner side, and below the internal malleolus was a remarkable projection, the toes were turned out, and the foot was inclined in the same direction: the astragalus must have been dislocated inwards, both from the calcis and os naviculare, so that its inferior surface, instead of resting upon the upper part of the os calcis, was placed against its inner side. The reduction was accomplished by bending the leg at right angles with the thigh, and extending the foot in a line with the leg, the knee being fixed; at the same time, Mr. Cline placed his knee upon the outer part of the joint, and pressed the foot firmly against it, forcing the bones into their natural positions. The limb was enveloped in a bandage, and placed as much as could be on the outer side, upon a well padded splint, to which it was secured by tapes. The spirit lotion was applied. On the 1st of July, the man had some sickness and pain, which was relieved by bleeding, otherwise he recovered without any urgent symptoms, and was dismissed from the Hospital on the 26th of August, being able to use his limb tolerably well.

Another case of compound dislocation of the astragalus also occurred under the care of Mr. Henry Cline, for the particulars of which I am indebted to Mr. Green. The accident, as the former, had been produced by the fall of a heavy stone. The foot was turned inwards; the anterior or navicular surface of the astragalus was exposed by an extensive opening; a wound on the inner side exhibited the articular surface of the os calcis for the astragalus. The reduction was made by placing the limb in the same position as for the reduction in the former case; then by extending the foot, and at the same time rotating it outwards.

The patient was a stout, middle-aged labouring man, of not very

sober habits, and subject to gout. Extensive erysipelatous inflammation, which terminated in sloughing, and which gave rise to a great deal of constitutional irritation, retarded his recovery, which was, however, ultimately complete.

Mr. Green was likewise kind enough to furnish me with the following particulars of a case which was under his own care in St. Thomas's Hospital.

Case.—Thomas Toms, a bricklayer, aged twenty-three, was brought to the Hospital on the 14th of July, 1820; he had fallen from a scaffold at the height of three stories, and in his fall the foot had been caught between two of the spikes of an iron railing, and in this way he became suspended, with his head downwards. When admitted a large wound existed beneath the inner malleolus of the left leg, through which protruded the anterior articular surface of the astragalus which had been separated from the navicular bone. The foot was inclined upwards and outwards; the tendons of the flexor muscles were tightly stretched; the posterior tibial artery had been torn through, and the accompanying nerve partially lacerated. Several attempts were made to replace the dislocated bone, but without success, although the wound was enlarged with a scalpel. As I was at the Hospital, Mr. Green requested me to see the case, and after a careful examination of the injured limb, I proposed the removal of the astragalus, as much preferable to amputating the limb. Mr. Green therefore carefully separated the ligamentous connexion of the astragalus, and took it away; a ligature was put upon the posterior tibial artery. The natural position of the foot, &c., being then as near as possible restored, the edges of the wound were brought together and supported by straps of adhesive plaster; the limb was placed upon its outer side, on a well padded splint, having a foot piece; the evaporating lotion was applied on the limb. For several days after the injury the patient suffered a good deal from febrile symptoms, and some occasional pain in the ankle; but when the suppurative process was well established, about the seventh day, all these unpleasant symptoms subsided, and he proceeded very favourably until the end of July, when the formation of an abscess again gave rise to some constitutional derangement, which was relieved as soon as the matter was discharged. A second collection of matter which occurred about the end of August, again retarded his recovery, and he continued in an indifferent state until the 7th of September, with loss of appetite, and slight hectic; the leg becoming slightly œdematous, but the discharge from the wound continuing copious. From that period he mended rapidly, but little occurring to retard his recovery, which was complete on the 25th of October. He left the Hospital on the 2d of November, and has since resumed his business, without any inconvenience.

Dislocation between the Tarsal Bones.—Another form of dislocation of the tarsal bones sometimes occurs from the falling of heavy weights upon the foot; by which the five anterior tarsal bones, together with metatarsus and toes are displaced, the connexions between

the astragalus and navicular, and between the calcis and cuboid, being in a great measure destroyed.

Cases.—A man was brought into Guy's Hospital, in consequence of an injury to his foot, upon which a very heavy stone had slipped. The fore part of the foot was turned up, whilst the posterior part formed of the astragalus and os calcis remained in the natural state ; it presented very much the appearance of a club foot. The reduction was effected by fixing the heel and leg, and extending the anterior part of the foot. In five weeks the man had regained perfect use of the limb.

For the particulars of the following interesting case of compound dislocation, I am indebted to Mr. South. The case was under the care of Mr. Henry Cline, in St. Thomas's Hospital.

Thomas Gilmore, aged forty-five, a stout man, and in the habit of drinking freely, was admitted into the Hospital on the 28th of March, 1815, in consequence of an injury to his ankle, which had been occasioned by the falling of a very heavy stone upon his heel. On the fore and external part of the joint was a large wound, reaching from the middle of the inferior extremity of the tibia to the external malleolus, and exposing the anterior articular surface of the astragalus, for the navicular bone, and also that for the os calcis on the outside ; the tuberosity of the os calcis projected outwards, and the toes were directed inwards, towards the other foot. The natural position of the parts was restored by extending the foot and rotating it outwards. The edges of the wound were approximated, and retained in contact by the application of straps of adhesive plaster ; the limb was placed in a fracture-box upon the heel, and linen dipped in cold water was placed over the seat of the injury, in consequence of some slight bleeding. During the following night he suffered much from spasms in the limb, and slept but little ; but no urgent symptoms presented themselves. On the 30th, severe constitutional irritation had been set up ; he was delirious, his pulse was very quick, his skin hot and dry, his mouth parched, and he had rigor. Some inflammation appeared about the wound. He continued in this state until the 2d of April, with some extension of the inflammation up the leg ; taking every six hours the fever mixture, with some antimonial wine. On the second the severity of the constitutional symptoms had subsided, but he complained of pain in the wound, and the limb exhibited an erysipelatous blush, with some œdema ; a small spot on the leg, which had been bruised, was ulcerated. He proceeded favourably until the 5th, when the constitution became seriously affected, but the symptoms indicated a state of debility, and the ulcer on the leg was in a sloughy state, although the original wound secreted a healthy pus. He was ordered the bark in decoction. Until the 10th, these unpleasant symptoms were present with little alteration, and the superficial inflammation of the limb extended nearly to the groin, and matter appeared to be forming in different parts ; he was allowed a pint of porter, and a grain of opium twice in the day. After this period, the inflammation gradually subsided, and the constitutional suffering became much lessened ; the

quantity of porter was increased to two pints daily, and subsequently to three pints, on account of his weakness. Several superficial sloughs formed on the leg, which separated very slowly, not being got rid of until the 15th of May. His appetite and spirits varied considerably, but without any further serious drawback, he gradually recovered, and quitted the Hospital on the 12th of September, being then able to walk easily with the assistance of a stick.

Dislocation of the Internal Cuneiform Bone.—I have seen two cases of dislocation of the internal cuneiform bone; the first was in a gentleman, who came to consult me a few weeks after the injury; and the second was in a patient at Guy's Hospital. Both presented the same characters; the bone projected inwards, and also a little upwards, being drawn up by the action of the tibialis anticus muscle.

In the first case, the dislocation was produced by a fall from a height; and in the second, by the fall of a horse, the foot being caught between the horse and the curb stone.

In neither instance was the bone replaced, but the displacement did not occasion any important lameness.

Treatment.—I should recommend in the treatment of these accidents,—first, to confine the bone as much as possible in its natural position, by binding a roller around the foot, and to keep the bandage wet with an evaporating lotion, until the inflammation has subsided, and then to employ a leather strap, which can be buckled around the foot, so as firmly to confine the bone until the ligaments are reunited.

OF DISLOCATIONS OF THE TOES.

Seat of.—These dislocations are common either between the metacarpal bones and phalanges, or between the phalanges themselves. The same treatment should, in such cases, be adopted, as directed for similar injuries to the fingers.

Case.—I had a man under my care in Guy's Hospital, who, in falling from a height, pitched upon the extremities of the toes, and had forced the first phalanges of the smaller toes, above the ends of the metatarsal bones, where they projected very much. Several months had elapsed after the receipt of the injury, which rendered all attempts to reduce the bones useless. The patient was afterwards obliged to wear a piece of cork hollowed at the bottom of the inner part of the foot, to prevent the pressure of the metatarsal bones upon the vessels and nerves.

OF DISLOCATIONS OF THE LOWER JAW.

Two Forms of.—The dislocation of the lower jaw may be either complete or partial; when complete, both of the condyles are thrown into the space between the zygomatic arch, and the surface of the

temporal bone ; but when partial, one condyle only escapes, whilst the other remains in the articular cavity.

OF THE COMPLETE DISLOCATION.

Signs of.—When this accident occurs, the patient appears as if in a continued yawn, the mouth being widely open, without any power on the part of the patient to close it. Some trifling degree of motion often exists, so that the chin can be either elevated or depressed a very little. The chin is advanced, the cheeks are protruded by the coronoid processes, and a hollow is perceived immediately before the meatus auditorius, on account of the absence of the condyloid process from the glenoid cavity. The secretion of the parotid glands is increased, and dribbles over the chin, and the pain is at first severe.

Causes of.—The displacement may be occasioned by excessive yawning, by a blow upon the chin when the mouth is open, or by endeavouring to force any solid substance into the mouth, too large for the ordinary aperture. Mr. Fox, the dentist, informed me that he had known a dislocation of the jaw take place from spasmodic action of the muscles, when the mouth was widely opened to allow of the extraction of a tooth.

The reduction of the dislocation should, as in other cases, be effected as speedily as possible, in the mode which the following case will best explain.

Case.—I was called by Mr. Weston, of Shoreditch, to visit with him a madman at Hoxton, who had had his jaw dislocated in an attempt to force some food into his mouth. Knowing that there would be great risk in employing the means usually recommended, I adopted the following plan :—I had the patient placed upon his back, with a pillow to receive his head, and in that situation he was firmly held ; then having procured two forks, I wrapped a handkerchief round their points, and passed the handles into the patient's mouth, one on each side, behind the molares teeth, and whilst they were held in that situation, I forcibly drew the lower jaw towards the upper, by placing my hand under the chin ; in this way, the reduction was easily accomplished.

Treatment.—I prefer, however, the use of corks, instead of any more solid substance, which is likely to injure the gums ; those employed for stopping the common quart bottles are of about the proper size, and should be placed one on each side of the mouth, behind the molares teeth, after which the chin is to be raised in the manner already described.

Employment of a Lever.—A long piece of wood is sometimes employed in these cases as a lever, introducing it between the molares, first on one side, and then upon the other, and each time raising the extremity of the wood furthest from the mouth, so as to depress that part of the lower jaw beyond the molares teeth, and with it the condyloid

process, when the action of the muscle will draw it into its articular cavity.

Another Mode.—Another mode which will generally succeed if the dislocation be recent, consists in placing the thumbs, which should be well covered, at the roots of the coronoid processes, and with them forcing that part of the jaw downwards and backwards, and at the time pressing the chin upwards.

Liability to Recur.—When once this dislocation has happened, the patient is very liable to a further displacement. After the reduction, a bandage should be applied, having four tails, two at each end, and a hole in the centre to receive the chin ; of the tails, two are to be tied over the head, and two behind the occiput ; and the patient should not be allowed to masticate any solid food, until sufficient time has been allowed for the union of the lacerated parts.

OF THE PARTIAL DISLOCATION.

Signs of.—In this case, the condyloid process on only one side is displaced ; the mouth opened, but not so much as in the complete dislocation ; the chin is directed to the side opposite the injury, and thrown out of the axis of the face.

Cause of.—This dislocation is usually produced by a blow on one side of the jaw when the mouth is open.

Reduction.—The reduction may be accomplished either by the cork or the lever of wood.

OF SUBLUXATION OF THE JAW.

Signs of.—The condyloid process of the lower jaw, is, as I have already described the condyles of the femur to be in the knee joint, sometimes displaced from the inter-articular cartilage of the joint slipping before its edge ; fixing the jaw with the mouth slightly open.

Reduced by Efforts of the Patient.—The efforts of the patient alone are usually sufficient to remedy the evil, but I have known it exist a length of time, and afterwards the motion of the jaw and power of closing the mouth return.

Cause of.—The displacement rarely happens but from extreme relaxation of the ligaments.

Treatment.—If called upon to relieve a patient under these circumstances, the force employed should be applied directly downwards, to separate the condyloid process from the temporal bone, and thus allow the cartilage to resume its proper situation.

Frequent in Young Women.—I have most frequently seen this accident in young women, and have found such remedies as will invigorate the constitutional powers, as ammonia and steel, with the shower bath, most serviceable in subduing the tendency to its recurrence.

APPENDIX.

ON THE AREOLAR, OR MAMMILLARY TUMOUR.

BY SIR ASTLEY COOPER, BART.

Age at which it Occurs.—AT the age of seven years, and from that period until puberty, children are not unfrequently subject to the swelling behind the nipple, or mammillæ of the breast. This swelling occupies a circle of an inch or more, involving the posterior part of the nipple.

Symptoms.—The child, feeling uneasiness in the part, is led to examine it with attention, and then finds a swelling, which is generally tender to the touch, and is sometimes, though not commonly, acutely sensitive. The skin over it is undiscoloured; it moves freely upon the pectoral muscle; but the nipple moves with it. I have seen it frequently, both in boys and girls; but I think more frequently in the male than in the female. It generally affects only one breast; but sometimes, though rarely, it exists in both. It does not appear to accompany a scrofulous disposition, but is found in irritable young persons. The age at which it has most frequently presented itself to my observation, has been from eight to twelve years.

Within this period, then, a surgeon will be sometimes called upon to remedy a hard circular sensitive tumour behind the nipple, and areola. Its cause I shall presently proceed to explain, when existing at this period of life.

Not Productive of Serious Mischief.—I have never seen it productive of any serious disease. Sometimes, however, it endures for several months, if attention be not paid to the means for its removal.

Treatment.—The best mode of treatment consists in the application of the emplastrum ammoniaci cum hydrargyro, and in giving small doses either of the hydrargyrus cum cretâ, with rhubarb, or of the oxyurias hydrargyri, with bark or sarsaparilla; under the influence of which remedies, it generally becomes gradually absorbed in the space of from two to three months. It sometimes yields to evaporating lotions.

Disease in the Adult.—The same part which it affected posterior to the nipple, in earlier periods of life, becomes the seat of more serious disease in after age. For the structure, which I am presently to describe, is liable, particularly in the male, to be affected with the two malignant diseases to which the body is subject, namely, to the scirrhus affection, or to the fungous.

OF THE SCIRRHUS OF THE MAMMILLA.

Symptoms.—This disease begins with a circular swelling at the root of the nipple. It is at first free from pain, but is excessively hard, and is somewhat irregular upon its surface. It gradually increases in size, and during its growth a shooting, darting, and occasionally a lancinating pain strikes through the swelling, and to the shoulder, in the course of the mammary nerves.

Ulceration.—A slight ulceration next supervenes upon the surface of the nipple, which is succeeded by a yellowish brown incrustation. When the first incrustation is separated, it is succeeded by another, and a deeper ulceration ensues, by which process the nipple of the breast is gradually removed, and the scirrhus substance is exposed. Whilst the ulceration is proceeding in the centre, the scirrhus increases in circumference, until it occupies a considerable circle round the nipple, and as the bulk of the disease augments, the pain with which it is accompanied is likewise aggravated; yet the diseased part is only in a slight degree tender to the touch, and the patient is often seen to handle it in an unfeeling manner.

Bleeding.—The discharge from it, which had previously formed an incrustation, now increases and becomes fluid, and the sore frequently bleeds.

Glands affected.—The glands in the axilla become enlarged and hardened, after a long continuance of the complaint. The patient's lungs become diseased, and water is effused into the cavity of the chest. I have seen several males, and one or two females die of this complaint; and I have given a view of the appearance which the swelling assumes on dissection.

Removal necessary.—As this disease is beyond the control of medicine, for none that I have ever known recommended, or seen employed, seems to have the least influence in preventing its destructive effect, its removal must necessarily be effected either by the knife or by the application of arsenic. The former mode is vastly preferable to the latter; it is upon the whole less painful in the execution, and it is of more certain efficacy in completely removing the disease. Arsenic, on the contrary, often but partially removes the complaint: and the irritation which it excites extends the disease to the neighbouring absorbent glands. The absorption of the mineral, also, sometimes produces serious effects upon the constitution. When the disease is clearly and completely removed by the knife, the edges of the wound are brought together, and they readily unite by adhesion.

Treatment if an Operation cannot be performed.—If the disease has been neglected, if extensive ulceration has ensued, and the complaint has proceeded beyond the relief which is to be derived from surgical operation, the applications which I have seen most advantageous in tranquilizing the sore, and improving its appearance, have been chalk and opium, in the proportion of an ounce of the former to a drachm of the latter; oxyde of zinc and opium in the same proportions; or oxyde of bismuth with opium. These means, however, only retard the pro-

gress of the disease, rendering the descent to the grave a little more easy and a little less rapid, but they do not prevent the fatal termination of the complaint.

OF THE FUNGOUS TUMOUR OF THE MAMMILLA.

Symptoms.—Of the fungous tumour of this part I have seen three different instances, each of which existed in the male, and each was removed.

The tumours began behind the nipple, which adhered firmly to their surfaces. They were globular, and did not possess the hardness of true scirrhus, but felt at first more like simple chronic tumours, and grew less firm as they increased. They were but slightly tender when pressed, and entirely free from pain. They neither of them had ulcerated. After they had existed for several months they began to increase rapidly, and this circumstance excited alarm in the minds of the patients, so as to lead them to make application for surgical assistance. The medicines which I advised, and the applications which I proposed, appearing to have no influence in preventing the progress of the disease, I recommended extirpation. Two of the patients recovered without any returning disease; the third, after a few months, sunk under what was believed to be hepatic disorder.

More Spongy than Scirrhus.—I have given a plate of the appearance of one of these tumours; it is much more spongy than the true scirrhus. The vessels which it possesses are more numerous, and their diameters larger, more especially of the veins. It not only adheres to the nipple, but it proceeds from its basis. The vessels which supply it are of considerable size, and require to be carefully secured to prevent after hæmorrhage. In neither of the cases had it contracted adhesion to the pectoral muscle; and there was therefore no difficulty in detaching it from the surrounding parts.

ON THE SEAT OF THESE DISEASES.

Having thus described the diseases which are placed at the basis of the nipple, I shall now proceed to point out the structure in which these complaints begin; and which the plates connected with the work will very clearly explain.

Discharge of Fluid from the Nipple of the Infant.—A child born at the full period of gestation, whether it be male or female, is found to have, issuing from its nipple, a fluid of milky appearance, which, when alcohol is poured upon it, deposits a solid, which has the appearance of coagulated albumen. This fluid the nurses are in the habit of pressing out; as they pretend that it is liable to excite inflammation if suffered to remain. Whether this be the case or not, or whether the inflammation which sometimes ensues be the result of pressure and friction which the nurses employ, I am not able to state; but inflammation does sometimes ensue, and requires fomentation for its relief.

Structure of the Part.—Thirty-two years ago I first learned there was such a discharge from the nipple ; and was led to examine whence it proceeded ; when, upon making a section through the middle of the nipple towards the ribs, I found a circular glandular structure, larger than a pea, and situated directly behind the nipple. It is of a red colour, from its extreme vascularity. It contains ducts which open at the nipple ; and from these may be pressed, first a milky fluid, afterwards a sebaceous matter. The nipple over it is situated in a depression, and appears red and granular in many subjects. The artery which supplies the gland is derived from the axillary ; and the branches derived from, and distributed to the gland are numerous. Veins return the blood in the course of the arteries ; and filaments of nerves from the axillary plexus are distributed to it.

Mode of exhibiting it.—All that is necessary to do, in order to observe this structure, is to make an incision through the centre of the nipple. In the foetal state between the seventh and the ninth month, this glandular substance is found, but of smaller size. At the end of the first year, it is still large, and continues so during the second and the third year ; and thenceforward it seems to lessen in both male and female until the seventh and eighth year. It is most conspicuous in fat subjects, as it is kept extended from the nipple by the adipose substance.

Evolution of the Nipple.—About the eighth year it begins to increase, but it varies as to time in different persons ; and as it grows towards the age of puberty the nipple becomes evolved from it. In the female, at the age of puberty two tumescences will appear ; the one a small sphere directly surrounding the nipple ; which then rather sinks into this little swelling ; and the other a larger sphere which is composed of the mammary gland, or gland of the breast. Thus there is a mamillary and a mammary growth ; a mamillary producing the nipple, which is gradually evolved as the breast increases ; a mammary which is composed of the lacteal gland, the lactiferous tubes of which proceed through the mamillary process. In the male the mamillary gland forms the nipple ; but instead of tubes proceeding through it, ligamentous cords are seen radiating from the point of the nipple through the mamillary substance. These ligamentous cords terminate in a compact cellular texture at the basis of the nipple ; and the cells thus produced become loaded with adeps, so as to sustain and preserve the projection of the nipple.

If, then, a section be made of the nipple of the male in the adult subject through its centre, radiated ligamentous cords are found in its substance, and a strong net-work containing fat at its basis. In the plate this will be well seen in a section of the nipple of Coombs, who was executed for murder, whom I selected on account of his age, and because he was a healthy person. I made a section through the nipple, and then threw it into warm water to melt out the fat which it contained, and thus unloaded the strong net-work of cellular tissue at its basis.

The evolution of the nipple is as follows :

In both male and female infants a gland exists which is the nidus of

the future nipple, over which the skin is puckered into a small projection. This glandular substance lies concealed under the skin until near the age of puberty, and then it gradually evolves, and becomes everted into the nipple of the adult. In the male, the tubes through which the milk of the infant passes become ligamentous cords in the nipple of the adult, and in the female the similar tubes become the lactiferous ducts of the nipple. Thus it is that the nidus of the adult nipple is protected until the age of puberty.

Disease seated in this Structure.—It is this structure, then, of the male and female nipple, prior to the age of puberty, at the time when evolution of the nipple is commencing,—which produces the swelling to which young people are subject, from the age of eight years to the period of puberty; for, when the action is greater than the evolution requires, a hard inflammatory swelling is produced.

It is in this structure that in future years the malignant areola or mamillary tumour forms. Here the scirrhus tubercle commences, which destroys the nipple, and ultimately extinguishes the life of the patient. It is in this structure that the fungous swelling which the plate exhibits is formed; and both of these are from the male. The female is less subject to the disease, because the mamillary substance is principally absorbed, and lactiferous tubes are formed in its stead.

EXPLANATION OF THE PLATES.

PLATE I.

- Figure 1. A view of the nipple as it appears in the male fœtus.
 2. A section of the mamillary gland in the male child at birth.
 3. A posterior view of the mamillary gland in the male child at birth.
 4. A section of the mamillary gland of a male two years of age.
 5. Section of the mamillary gland of a female twelve years of age.
 6. Section of a mamillary gland of a female four years of age.
 7. Section of the mamillary gland of a female at birth, with the vessels which proceed from the axilla.
 8. Section of the mamillary gland of a male five years of age.
 9. Section of the mamillary structure of Coombs (executed at Maidstone).
 The ligamentous substance seen which remains after the cessation of the glandular structure. Clusters of cells in the cellular tissue, from which the fat has been separated by putting the section into warm water.

PLATE II.

Figs. 1, 2, 3, represent different views of a mamillary tumour, taken from a person of the name of Left, aged forty years, on May 29th, 1824.

It commenced sixteen years before this period from a slight blow, but did not become larger than a pea during eight years. Four months before its removal it became occasionally painful, and increased considerably.

It was seated in the right breast behind the nipple and areola.

From the kind of pain he described to exist in it, I advised its removal. Upon cutting into it after the operation, I found it to have more of the fungoid than the scirrhus character, and was glad that I had removed it, as it appeared to me to be of a malignant nature.

I did not see the patient afterwards.

Fig. 1, *a*, Integument. *b*, The nipple. *c*, The tumour.

2, *a*, Integument. *b*, The tumour.

3, *a*, The tumour cut open.

On the 17th of November, 1824, I removed a tumour from the same situation for a hair-dresser in the city. Its size was rather less than the former.

The disease represented in figs. 4 and 5 begins in persons advanced in years, by a swelling behind the areola or nipple, and the latter becomes enlarged or drawn in.

When it ulcerates, the sore has a cancerous aspect; but it is rather more disposed to slough than the cancer of the female. The edge of the ulcer is ragged, the surrounding parts are hard, and the pain is of the lancinating kind, as in true cancer. The best case in illustration is to be found in the Medical Journal, published by Mr. Elliott, now a chemist in Fenchurch Street.

The disease extends to the absorbent glands in the axilla.

Fig. 4. An anterior view of the nipple of the male, in which the mammillary substance is affected with cancer; the nipple is enlarged, and the surrounding parts ulcerated. I removed it from a man between sixty and seventy years of age.

5. An internal view of the same disease, a section having been made through it to show the scirrhus deposit. It has very much the character of cancer in the female breast. *a*, The surrounding adeps. *b*, The scirrhus deposit.

PLATE III.

Showing the Positions of the Limb in the different Dislocations of the Hip.

- Fig. 1. The dislocation upwards upon the dorsum ilii. The limb shortened—the hip projecting—the knee and foot turned inwards, with the toes resting over the metatarsus of the sound limb.
2. The dislocation downwards into the foramen ovale. The limb lengthened—the knee advanced and separated from the other—the toes pointed—the heel does not touch the ground—the body bent forward.
3. The dislocation into the ischiatic notch. The limb shortened—the knee and foot a little turned inwards, with the great toe resting against the ball of the great toe of the sound limb.
4. The dislocation on the pubes. Projection at Poupart's ligament from the head of the bone, the limb widely separated from the other, and the knee and foot turned outwards—the limb a little shortened.

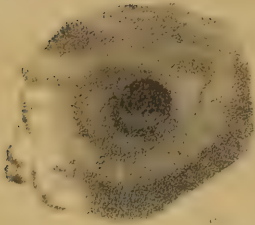
PLATE IV.

Shows the Mode of reducing the Dislocations of the Hip.

- Fig. 5. The bandages and pulleys applied to reduce the dislocation on the dorsum ilii.
6. The bandages and pulleys applied to reduce the dislocation into the foramen ovale.
7. The bandages and pulleys applied to reduce the dislocation into the ischiatic notch.
8. The bandages and pulleys applied to reduce the dislocation on the pubes.

Platel.

No. 1



No. 5



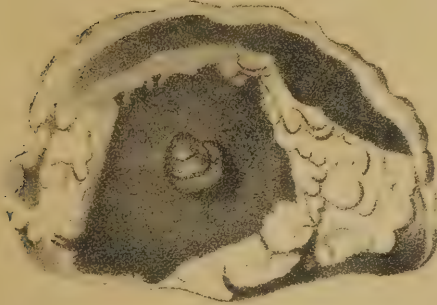
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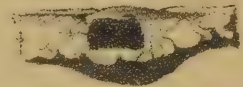
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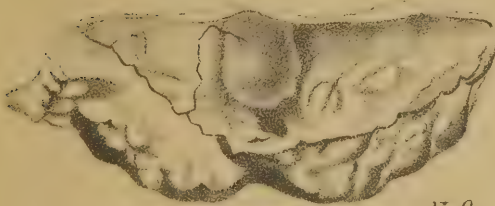
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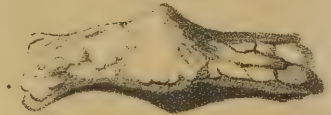
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No. 4



No. 8



No. 9

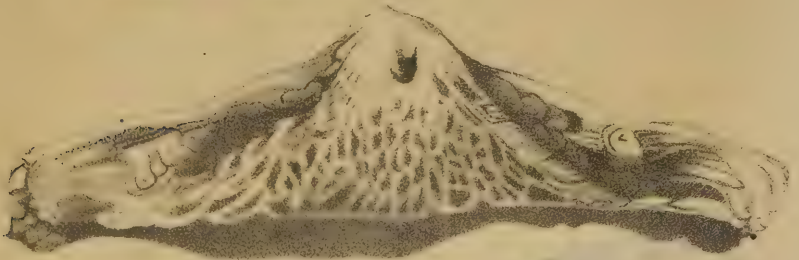


Plate II.

Fig 1

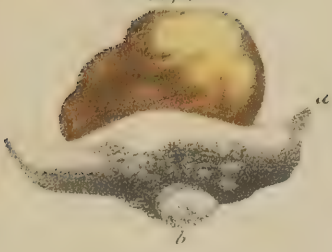


Fig 2



Fig 3

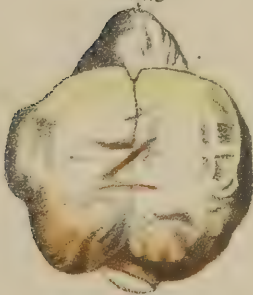


Fig 4



Fig 5

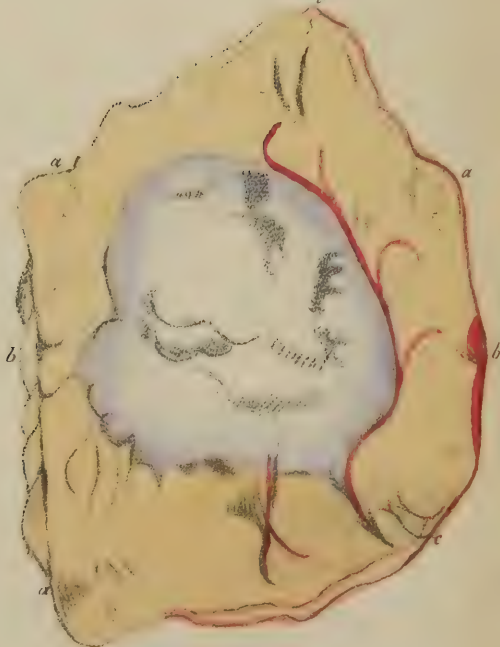
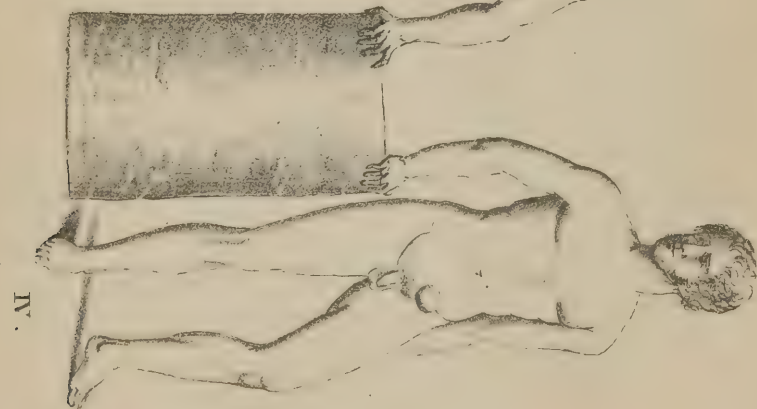
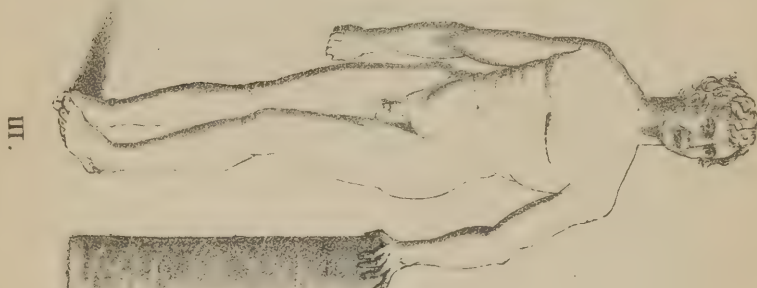
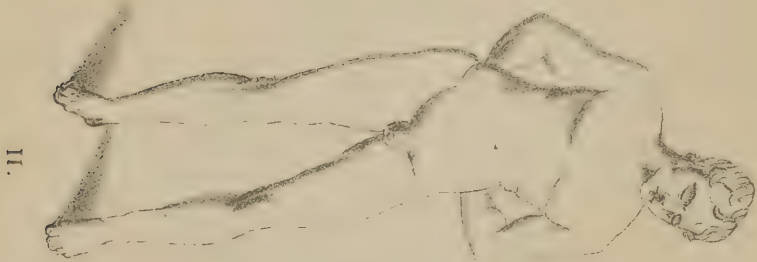


Plate III.



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Plate IV.



VIII.



VII.



VI.



V.



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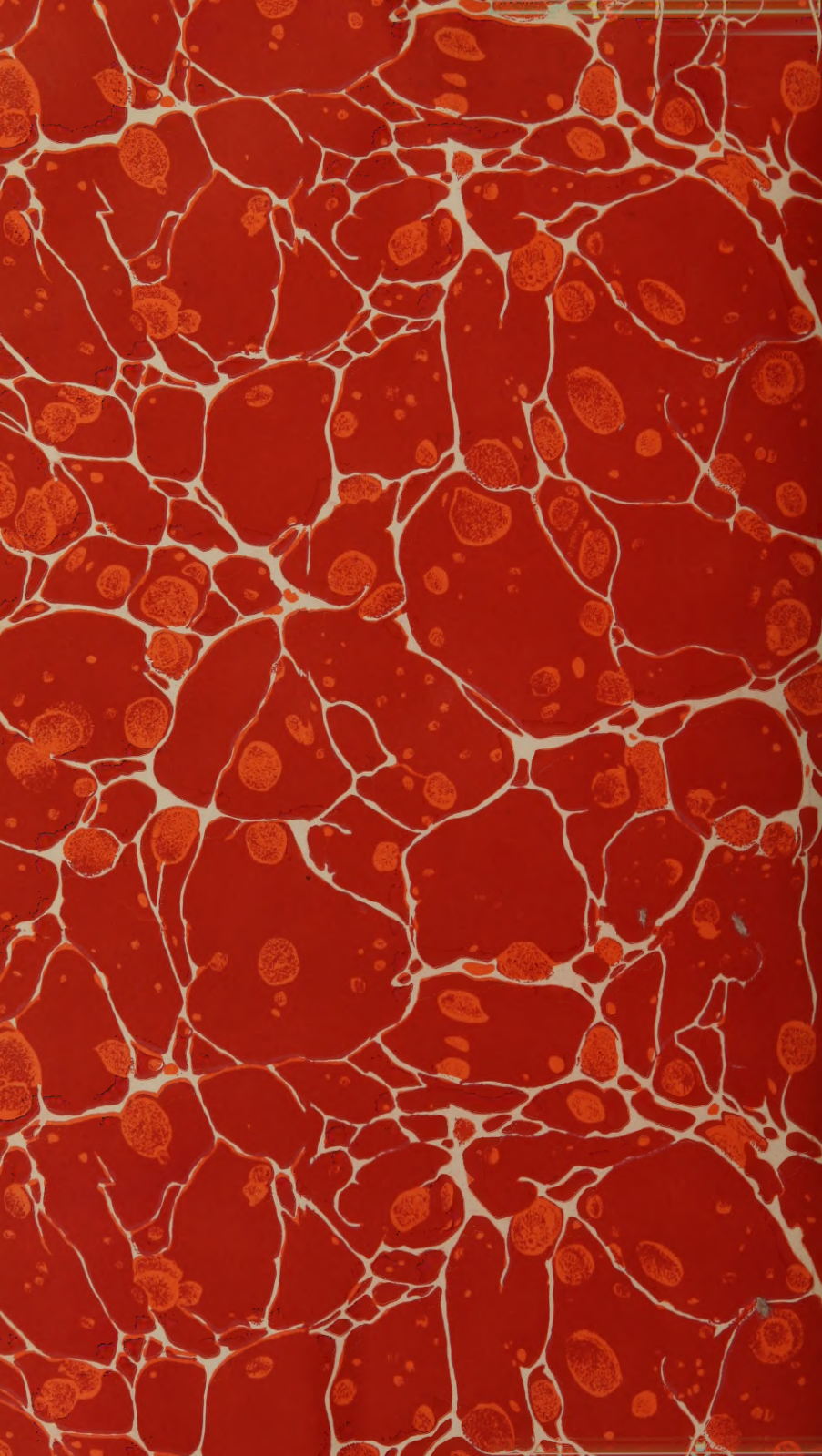
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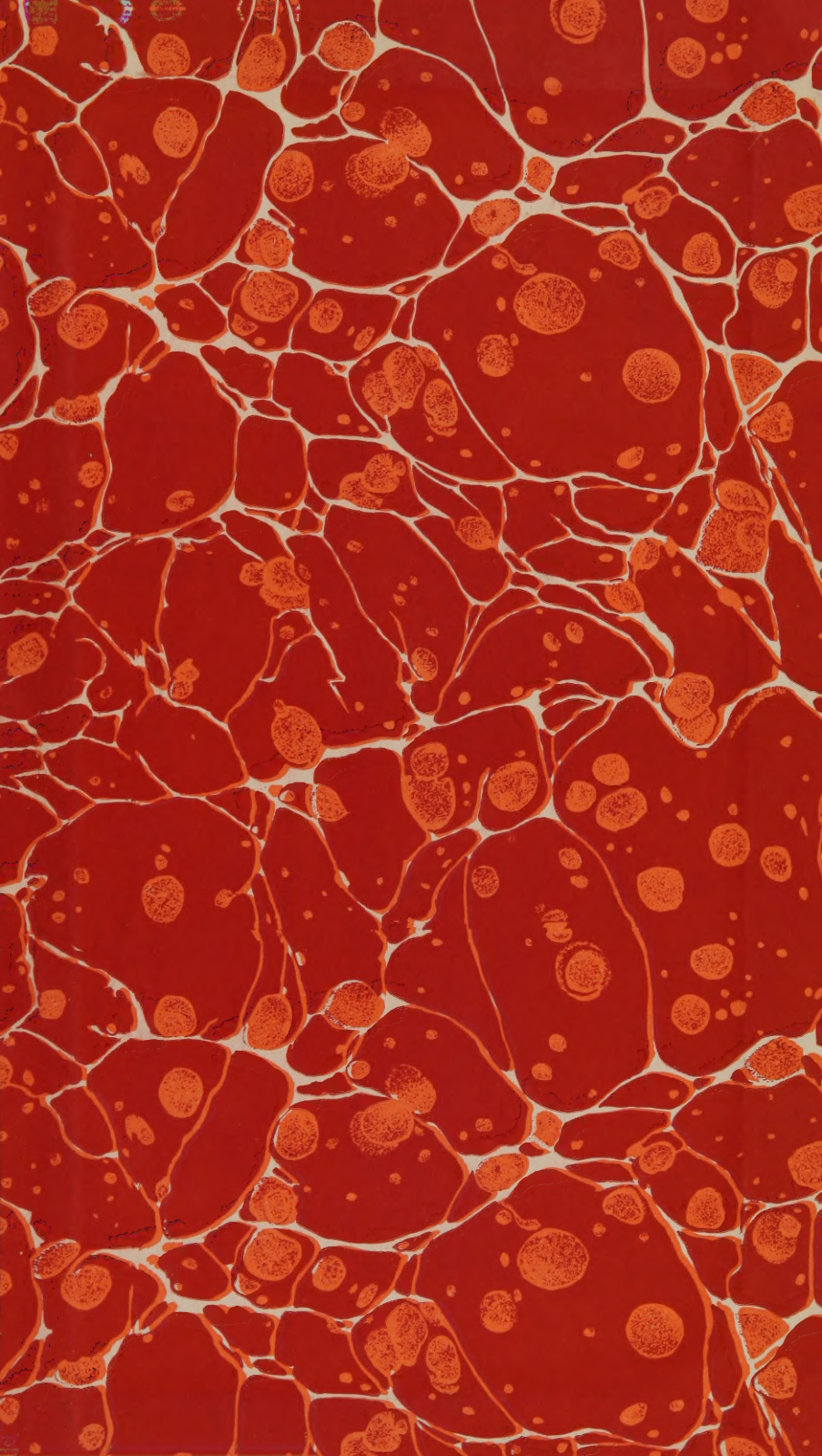
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